



*Transition to IBM Business  
Process Manager Advanced  
V7.5 for Developers*

(Course code WB754 / VB754)

**Instructor Guide**

ERC 1.0

Authorized



**Training**

WebSphere Education

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# Instructor course overview

This course enables the students to acquire the skills necessary to transition from a previous version of WebSphere Process Server to IBM Business Process Manager Advanced V7.5.

The emphasis is on the new architecture which was introduced with IBM Business Process Manager, as well as the tools which are new to students who may only have experience with WebSphere Process Server and WebSphere Integration Developer.

The lab environment includes a VMware virtual machine, installed with IBM Business Process Manager Advanced V7.5, and some support files.

This course assumes that the students are development professionals who have previous experience with WebSphere Process Server and WebSphere Integration Developer. For that reason, there is little information provided in this course as pertains to IBM Process Server and IBM Integration Designer. There are few differences between WebSphere Process Server V7.X and IBM Process Server for IBM Business Process Manager V7.5 so there is little to cover.

The greatest differences for those participants who may have previous experience with WebSphere Process Server are the IBM Process Designer and IBM Process Center tools. This course focuses particularly on these tools, and how to use these tools with IBM Process Server and IBM Integration Designer. Although those differences are chiefly IBM Process Designer and IBM Process Center, this course is not intended to teach students in-depth knowledge of those tools. Students can obtain detailed instruction about these tools in other classes, such as WB733 / VB733: *Process Modeling and Implementation with IBM Business Process Manager (BPM)*

## Course strategy

### Teaching strategy

Each classroom session uses a combination of facilitated lecture, discussions, group exercises, and demonstrations to convey the material.

### Introduce the material

Inform the students of the objectives of the unit and topic. Give them a brief scenario that help them understand how the presented material assists them in performing their jobs.

### **Facilitate the learning experience**

Involve the students in the learning process. Ask them questions and present classroom scenarios in which students use the available resources to solve situations involving process, procedure, or content on the job.

### **Review the material**

Review objectives at the conclusion of each unit to ensure that the students have a thorough understanding of the material.

Group exercises and labs are used to reinforce knowledge and skills that the students have learned in the previous classroom topics. The instructor serves as a mentor in checking results, answering questions, and providing constructive feedback and evaluation.

### **Course evaluation**

Evaluation measures the quality, effectiveness, and impact of the course. It enables students to answer the question, “Are the requirements and objectives of the course being met?”

For all classes, students provide feedback on course quality by completing an end-of-course questionnaire.

### **Measurement plan**

There are no formal tests administered in the class.

### **Course materials**

- *Student Notebook*
- *Instructor Guide*
- PowerPoint visuals in PDF form to be displayed
- *Student Exercises*
- *Instructor Exercises Guide*

## **Summary of changes in this edition**

This is a new course. The purpose of this course is based upon three principles: to introduce the new features of IBM Business Process Manager Advanced V7.5, to expound upon its architecture, and to assist developers in properly positioning the tools of the product.

### **About IBM Process Designer and IBM Process Center**

These products, formerly under the name WebSphere Lombardi Edition, are now part of the IBM Business Process Manager V7.5 portfolio. IBM Process Designer and IBM Process Center are included in all editions of IBM Business Process Manager V7.5. However, IBM Integration Designer (formerly named WebSphere Integration Developer), IBM Process Server (formerly WebSphere Process Server), and the mediation capabilities of the WebSphere Enterprise Service Bus are only included in the advanced edition. Refer to the information center for more information regarding the different IBM Business Process Manager configurations.

The purpose of this course, however, is not to provide in-depth, technical knowledge about these products. There are other published courses, such as WB731/VB731 and WB733/VB733, which can provide that instruction. Instructors must urge students to attend one of these classes if the student requires more information about IBM Process Designer and IBM Process Center. The intent of this course is to introduce these products, and to demonstrate their relationship to those tools with which the developer may already have experience: IBM Integration Designer and IBM Process Server. It is an important part of the development process to properly use the tools of IBM Business Process Manager.

If students are already familiar with the WebSphere Lombardi Edition products, or if students do not have the prerequisite WebSphere Process Server background, then it is recommended that they study course WB751/VB751 instead.

### **How to position IBM Process Designer and IBM Process Center**

Like Integration Designer, Process Designer can create business processes. In Process Designer, developers create business process diagrams (BPDs) in a process application. This practice is analogous to developers creating BPELs in a module in Integration Designer. All process applications are stored on a central repository: IBM Process Center.

One key difference between BPDs in Process Designer and BPELs in Integration Designer is the language. Process Designer introduces an interface that leverages elements of Business Process Modeling Notation (BPMN), considered a standard in process notation. This interface makes modeling a business process slightly more intuitive than in Integration Designer. At the development level, BPDs are stored in the Process Center repository as proprietary XML blobs. In Integration Designer, however, they are stored as standard BPEL artifacts. At run time, BPDs are instantiated as proprietary JavaScript objects. Process Server instantiates BPELs as standard Java objects.

You may choose to think of Process Designer as a replacement for WebSphere Business Modeler and, in truth, you would not be inaccurate to think so. Process Designer offers much of the same functionality as offered in WebSphere Business Modeler, but also allows developers to build implementations for activities in a BPD.

This additional functionality may cause some confusion among the students. Why should a company choose the advanced edition (which includes Process Designer and Integration Designer) over the standard edition (which only includes Process Designer), when developers can build process diagrams and implementations in Process Designer?

There are several reasons why both of these development environments should be used in a project. The principle reason is that Process Designer is used for modeling processes, and Integration Designer is used for developing low-level, technical integration. Consider the following:

- Integration Designer separates the implementation from the module. Process Designer Implementations are built directly in a process application and cannot be shared between other process applications, unless those artifacts are built into a toolkit (which is analogous to a library). Integration Designer, however, offers developers the opportunity to build implementations across many modules, and leverage them through imports and exports. This functionality creates more of an SCA solution, offers application flexibility, and minimizes compartmentalization.
- Integration Designer offers more options in developing implementations. Process Designer has simple, but effective, editors to create business objects, human tasks, and business rules. Integration Designer, however, offers all of these features and more, in some cases even using accepted industry standards (such as business objects (SDOs) and interfaces (WSDL)). For example, Process Designer can only capture business rules in a decision table, whereas Integration Designer may capture rules dynamically in either configurable decision tables or rule sets. Process Designer, therefore, is an effective tool for high-level business users and managers to model processes. Integration Designer is an effective tool for technical development professionals to build low-level implementations and integrate services.
- Integration Designer offers more client-facing options. Process Designer only offers one client-facing user interface for human task implementations: coaches. Coaches are easy to build and intuitive,

but only offer an HTML solution as the user interface; whereas Integration Designer also offers Dojo integration, JSF, Business Space, and BPEL Choreographer.

- Integration Designer offers more power. For complex transformations or implementations, developers using Process Designer can only add JavaScript templates to their implementation code. While these templates may be sufficient for many implementations, Integration Designer offers the full power of Java in its implementations.
- Integration Designer offers more integration capabilities. Using Integration Designer, developers can integrate their solutions with WebSphere Enterprise Service Bus to handle complex mediations and integrations, or most recently, with DataPower appliances.

When presented in this light, it is obvious that a likely solution scenario involves business professionals, such as business analysts and project managers, building high-level modeling assets using IBM Process Designer. In those same projects, technical development teams could use IBM Integration Designer to choreograph and integrate services. IBM Process Center offers a repository for teams to collaboratively share their assets in the overall solution.

### **What's new in IBM Business Process Manager Advanced V7.5**

The harmonization of the former WebSphere Lombardi Edition and WebSphere Process Server products has introduced several related features to IBM Business Process Manager.

- IBM Integration Designer now offers a Process Center perspective. This perspective is a “window” into the repository. Using this perspective, development teams can use assets in their integration modules and libraries, and then synchronize their changes to the repository.
- Assets may be shared between environments. When using the Process Center repository to share assets, development teams can consume Process Designer assets as import and export SCA components in an assembly diagram. Modeling teams, conversely, can consume Integration Designer assets as advanced implementations to their activities.

Students learn that the editors and features of each of the tools individually have not otherwise significantly changed in this version.





# Course description

## Transition to IBM Business Process Manager Advanced V7.5 for Developers

**Duration: 2 days**

### Purpose

This 2-day instructor-led course teaches students who already have experience with WebSphere Integration Developer and WebSphere Process Server the skills they need in order to be productive developers using the tools in IBM Business Process Manager Advanced V7.5.

Business process management has grown considerably since the release of IBM Business Process Manager V7.5. IBM Process Server and IBM Integration Designer are now tools of IBM Business Process Manager Advanced V7.5 along with IBM Process Designer and IBM Process Center. IBM Process Center provides a scalable central repository and control center for organizing and managing all process artifacts, applications, and services that are created. IBM Process Server is a high-performance business process engine that orchestrates services within an SOA, and WebSphere Enterprise Service Bus enables interaction between applications and services by using standards-based connectivity.

Through instructor-led presentations and hands-on lab exercises, students learn the concepts, architecture, components, processes, and procedures that are required to make the transition from previous versions of WebSphere Process Server to IBM Business Process Manager Advanced V7.5. Students explore the tools of IBM Business Process Manager Advanced V7.5, and learn how to use them to develop an integrated business solution. Students also explore the differences between business process diagrams in a process application or toolkit, the implementations of process components, and leveraging of the repository for controlling process artifacts.

In the intensive hands-on lab exercises, students develop and test a sample business integration solution. Students use a standards-based process design tool - IBM Process Designer - as part of the authoring environment to evaluate and explore a process application. These artifacts are then shared on the IBM Process Center repository for further, advanced development in IBM Integration Designer (formerly WebSphere Integration Developer). The IBM Integration Designer tool

is used to develop business integration solutions using the Service Component Architecture (SCA) programming model, the Service Data Object (SDO) data model, and the mediation flow programming model. Students then deploy the sample application to IBM Process Server.

## Audience

This course is designed for development staff members who already have experience with WebSphere Integration Developer and WebSphere Process Server.

## Prerequisites

This course assumes that students have development experience working with a previous version of WebSphere Integration Developer and WebSphere Process Server. Students without this experience should take this course after successfully completing course WB711 or VB711 (*Developing Applications for IBM WebSphere Process Server V7 - I*) or course WB111 or VB111 (*Integration Using IBM WebSphere Integration Developer and Process Server*).

Completion of course WB731 or VB731, Process Modeling with IBM Business Process Manager, is recommended, but not required.

## Objectives

After completing this course, you should be able to:

- Describe the IBM Business Process Manager V7.5 architecture
- Describe the purpose and business value of the tools included in IBM Business Process Manager Advanced V7.5, including IBM Process Designer, IBM Integration Designer, IBM Process Server, and WebSphere Enterprise Service Bus
- Identify and describe the features available in IBM Process Designer, IBM Integration Designer, and the Service Component Architecture
- Describe the structure of process applications and toolkits in IBM Process Designer
- Model a business process diagram in IBM Process Designer
- Work with business objects, business process diagrams, and activity implementations in IBM Process Designer
- Demonstrate the execution of a business process diagram using IBM Process Designer tools such as Playback

- Examine human task implementations using coach components

## **Curriculum relationship**

- WB731 / VB731: Process Modeling with IBM Business Process Manager
- WB733 / VB733: Process Modeling and Implementation with IBM Business Process Manager (BPM)
- WB751 / VB751: Developing Applications for IBM Business Process Manager Advanced V7.5 - I



# Agenda

## Day 1

(00:30) Course introduction  
(01:15) Unit 1 - IBM Business Process Manager architecture  
(01:00) Exercise 1 - Introduction to IBM Business Process Manager Advanced V7.5  
(00:45) Unit 2 - Business process modeling  
(01:00) Exercise 2 - Modeling business processes with IBM Process Designer  
(00:45) Unit 3 - IBM Process Center  
(01:15) Exercise 3 - Managing the IBM Process Center repository

## Day 2

(01:15) Unit 4 - Implementations - Core process artifacts  
(01:15) Exercise 4 - Implementing core business process artifacts  
(01:30) Unit 5 - Implementations - Activity process artifacts  
(02:00) Exercise 5 - Implementing business process activities  
(00:30) Unit 6 - Course summary



# Unit 1. IBM Business Process Manager architecture

## Estimated time

01:15

## What this unit is about

This unit describes the service-oriented architecture approach to business process management. The unit also lists the stages of the SOA development process and defines the role of WebSphere Process Server and WebSphere Enterprise Service Bus. You are also introduced to the tools of IBM Business Process Manager V7.5 Advanced edition in the context of BPM and SOA.

## What you should be able to do

After completing this unit, you should be able to:

- Explain the purpose of service-oriented architecture and the evolution toward SOA
- Define services in the SOA context
- List and describe the open standards that support SOA
- Describe the concepts of business processes and business process management
- Explain the various stages of SOA application development
- Describe the IBM products that support SOA application development
- Create a basic business process diagram using the basics of Business Process Modeling Notation (BPMN)
- Describe the purpose, advantages, and business value of using IBM Process Designer, IBM Process Server, IBM Process Center, IBM Integration Designer, and WebSphere Enterprise Service Bus

## How you will check your progress

- Checkpoint
- Machine exercise

## Unit objectives

After completing this unit, you should be able to:

- Explain the purpose of service-oriented architecture and the evolution toward SOA
- Define services in the SOA context
- List and describe the open standards that support SOA
- Describe the concepts of business processes and business process management
- Explain the various stages of SOA application development
- Describe the IBM products that support SOA application development
- Create a basic business process diagram using the basics of Business Process Modeling Notation (BPMN)
- Describe the purpose, advantages, and business value of using IBM Process Designer, IBM Process Server, IBM Process Center, IBM Integration Designer, and WebSphere Enterprise Service Bus

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Figure 1-1. Unit objectives

WB754 / VB7541.0

### Notes:



***Instructor notes:*****Purpose —**

**Details —** Encourage open discussion, and have students to share their experiences and challenges with business integration. All topics need to be discussed briefly since more detail is provided as the course progresses.

**Additional information —**

**Transition statement —** Next: Topics

## Topics

This unit is divided into the following topics:

- SOA and process integration
- SOA development and process management
- Overview of IBM Business Process Manager

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Figure 1-2. Topics

WB754 / VB7541.0

### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next, new topic: SOA and process integration



## **1.1. SOA and process integration**

### **Instructor topic introduction**

## SOA and process integration



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Figure 1-3. SOA and process integration

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

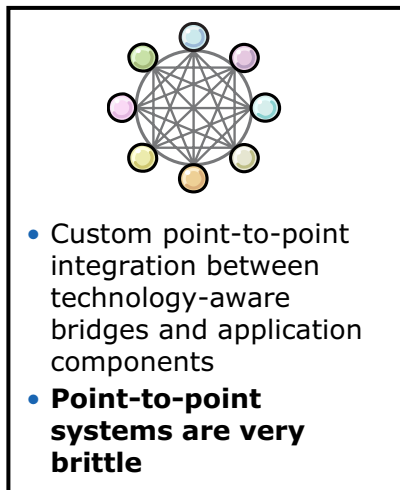
**Additional information —**

**Transition statement —** Next: Evolution of enterprise integration toward SOA

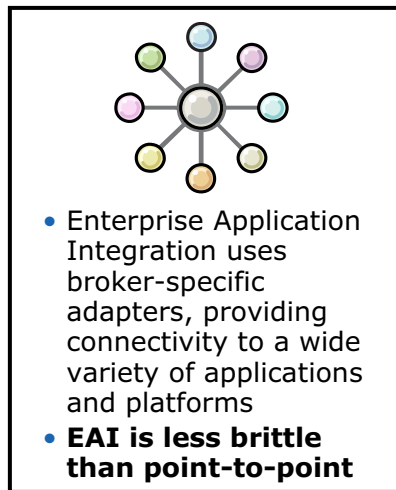
## Evolution of enterprise integration toward SOA

- Goal: a flexible and reusable architecture
- Integrate applications using **loosely coupled** and **well-defined** interactions
  - Hide the implementation details from the service-invoking application
  - Provide common service definition independent of specific technology

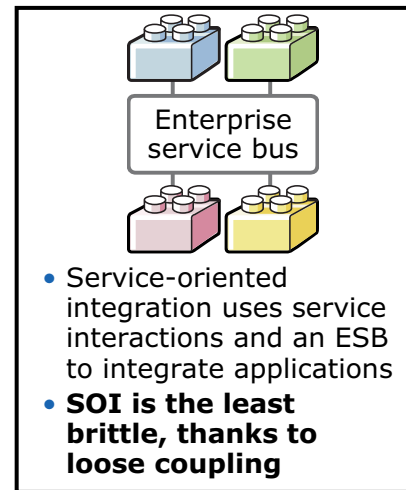
### Point-to-point connectivity



### EAI hub-and-spoke



### SOI using ESB



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Figure 1-4. Evolution of enterprise integration toward SOA

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### Notes:

Messaging backbones and point-to-point connectivity work well for direct application to application connection. They support high throughput and are comparatively simple to create and deploy, but they work best when you have a fairly small number of connection points that change infrequently or do not change.

Custom, point-to-point integration is expensive to maintain and expensive for new business requirements. Point-to-point integration is brittle; any change to an endpoint is likely to break it. Changes to internal components (operating systems, IP addresses, host names) can also break it.

Enterprise Application Integration is a hub-and-spoke integration design. This system relies on adapters to connect applications and data sources to a central hub. This design works well when you have a larger number of endpoints and when they change more frequently. When you add an endpoint or change how the endpoint connects, all you need to do is change one of the adapters rather than the connections to all the other endpoints. The downside of this is that it does not support high throughput well and the communications standards are proprietary and less interoperable.



Enterprise Application Integration is less brittle. Changes to endpoints might require some changes, but they do not ripple through the entire infrastructure as in point-to-point integration. Changes to internal components might force changes to other components since internal broker components are typically tightly coupled. Initial costs are higher than point-to-point, but maintenance efforts are much smaller.

SOA blends the best of all these concepts into one new architecture, giving users capabilities that they have never had before. Service-oriented integration (SOI) is the least brittle. SOI, if implemented using web services, has standard interfaces and is much cheaper for new business requirements. As long as the exposed interface (Web Services Description Language) does not change, the endpoint can be swapped with no integration impact. Changes to internal components have no impact since even the internal components are loosely coupled.

A review of early case studies indicates that organizations that use a service-oriented architecture (SOA) can reduce integration project development and maintenance costs by 30% or more. These savings are made possible by the increased effectiveness of component reuse that SOA enables.

SOA builds upon previous integration techniques but does not replace them. It is important to recognize that SOA is not the end of the road either. It is the next step in the evolution of flexible infrastructures. The desire to make IT more flexible is not new. Indeed, it is as old as the IT industry itself. Each of these integration techniques has its place and is appropriate for handling certain situations. IBM has experience and history in all of these approaches.

***Instructor notes:***

**Purpose** — The purpose here is to emphasize the evolution toward SOA and to point out that SOA is also evolving. Do not dwell on point-to-point and EAI. They are defined in the student notes.

**Details** —

**Additional information** —

**Transition statement** — Next: Services and service-oriented architecture

## Services and service-oriented architecture

- A **service** in SOA is:
  - A self-contained entity performing distinct business function
  - Based on open standards
  - A building block for composite applications that share information within and beyond the enterprise to include customers, suppliers, partners, and so on
- **Service-oriented architecture (SOA)** is an architectural approach to building distributed systems using service interactions.
  - SOA transforms the IT infrastructure into flexible, reusable, standards-based services.
  - SOA separates interface technology from implementation so knowledge of the underlying implementation details is not required to develop composite applications.
- The key to business agility is to reuse and combine standardized components (services) to address changing business priorities.

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Figure 1-5. Services and service-oriented architecture

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### Notes:

The short definition of a service is a “repeatable business task.” In SOA, services may be invoked by clients inside or outside the enterprise. Data is exchanged between services using well-defined interactions (messages and operations) based on open standards.

One way to provide an existing application as a service is to create an SOA gateway that translates the interfaces of the existing application into SOA-compliant interfaces. It involves no disruption to the application coding, so regression testing of the application is not necessary. New SOA interfaces need development and testing resources, and there may be interruptions as the new interfaces are deployed. After deployment, the application can be used through either the existing interfaces or the new SOA interfaces.

You can remodel the application into reusable SOA components and then combine those components into an SOA modular solution. It provides a more flexible application that can make better reuse of business logic; it benefits from SOA techniques and other modern programming practices. This way of providing existing applications as services has significantly more impact on the existing application and its use, and is most applicable to core systems.

## ***Instructor notes:***

**Purpose —**

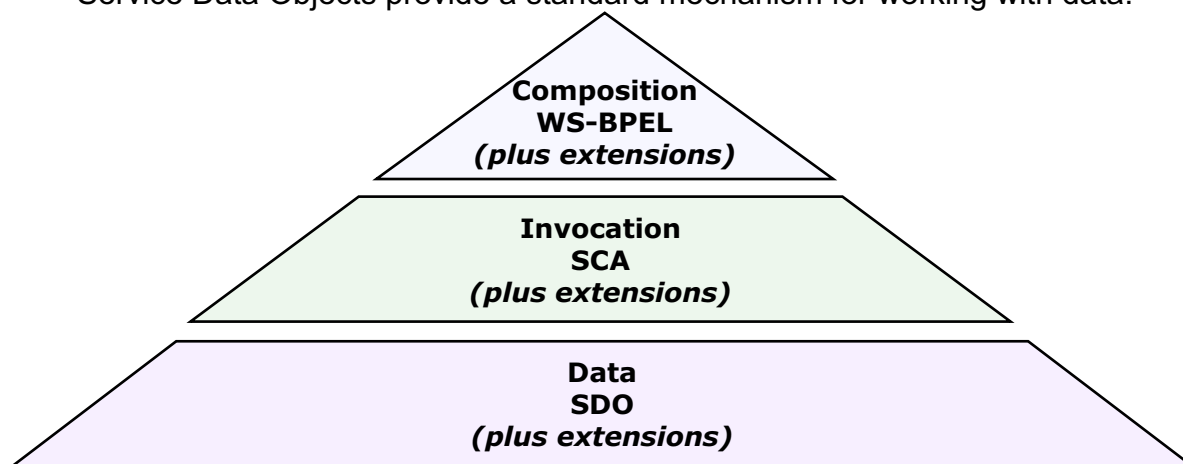
**Details —**

**Additional information —** Students might say, “service = web service.” In a sense, it is true. In a modern technology sense, when you talk about SOA, you are using the WSDL specifications to define a “service.” Therefore, you are invoking a distinct business function as a web service. In the future, as technology evolves, WSDL might be replaced by another technology.

**Transition statement —** Next, SOA programming model: Open standards with IBM extensions

## SOA programming model: Open standards with IBM extensions

- Data manipulation, service invocation, and process choreography are implemented in SOA using simplified, open standards.
  - Web Services-Business Process Execution Language (WS-BPEL) is used to choreograph service interactions.
  - Service Component Architecture is a programming framework that standardizes service invocation by isolating service implementation.
  - Service Data Objects provide a standard mechanism for working with data.



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Figure 1-6. SOA programming model: Open standards with IBM extensions

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### Notes:

Manipulation and handling of data is the core purpose and reason for all business processes. There are various ways that data can be represented, including:

- A Java Database Connectivity (JDBC) row set from a relational database
- A Java Message Service (JMS) message
- Java EE Connector Architecture (JCA) data coming in from a connector to some external application
- A Java Architecture for XML Binding (JAXB) object
- An EJB entity bean

Multiple ways of representing data require multiple ways of interacting with data.

There are various different ways to invoke processes to obtain and work with data. Invocation is the way in which a request is made from one piece of code to another. Methods include: EJB stateless session beans, Java APIs for XML-Based Remote

Procedure Call (JAX-RPC), JDBC for communicating with databases, JCA for connector architecture, and JMS for messaging.

Composition defines how to assemble a series of invocations that work on data to construct a complete process. It can also be done in various ways, such as with Java (using either a bean or a stateless session bean), with WebSphere InterChange Server collaborations, with the Flow Definition Language, and with BPEL (for defining business processes).

The SOA programming model used by IBM has evolved into simplified, open standards that include IBM extensions. Data is defined using Service Data Objects (SDO), providing a common way of accessing the data. Invocation is standardized using the Service Component Architecture (SCA). SCA defines a common means of calling services and associating them with different kinds of bindings so that the underlying invocations can fit into the various models (JMS or web services). Composition is simplified using Web Services Business Process Execution Language (WS-BPEL), which is used to choreograph services in business processes.

#### Composition (WS-BPEL)

- Uses business process execution language for web services

#### Invocation (Service Component Architecture)

- Describes all integration artifacts as service components with well-defined interfaces

- Includes the concept of a module (a group of service components)

#### Data (Service Data Objects)

- Open standard for enabling applications to handle data from heterogeneous data sources in a uniform way

- Incorporates Java EE patterns but simplifies the Java EE data programming model

***Instructor notes:***

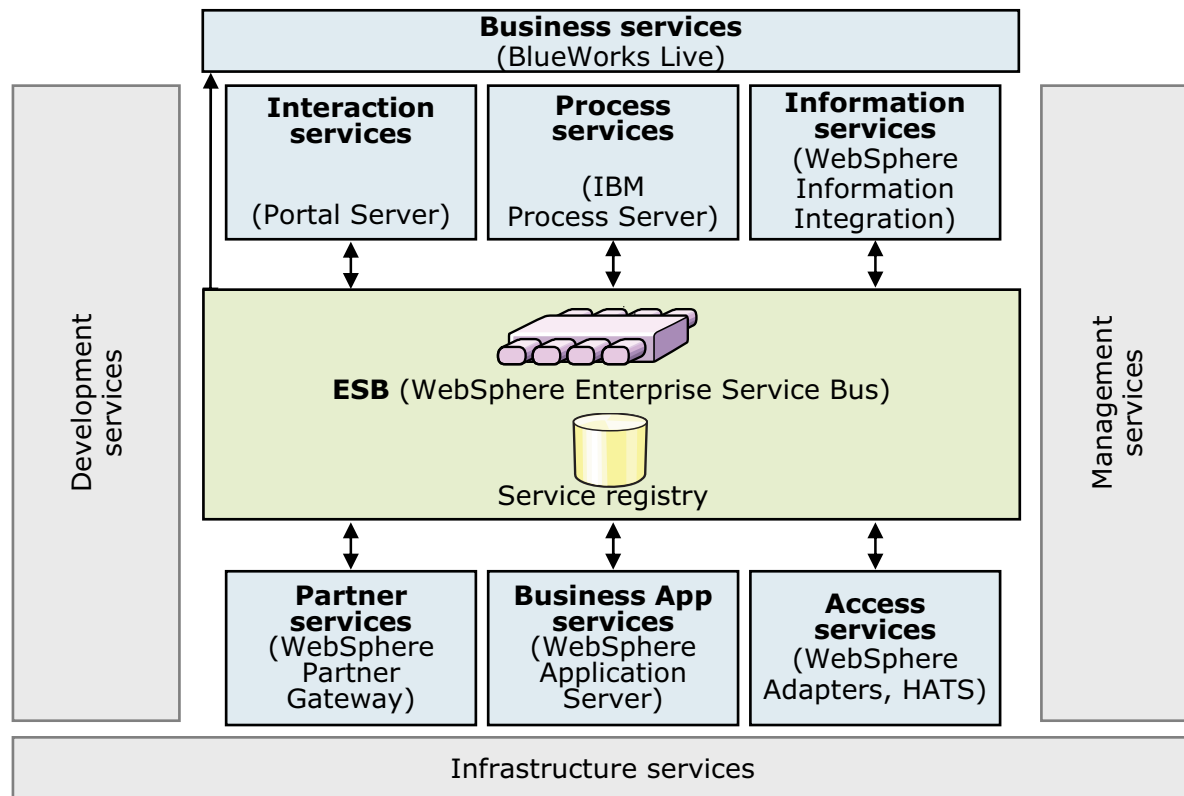
**Purpose** — This slide was condensed. The various types of technologies are all detailed in the student notes. The point here is to emphasize the core, IBM open standards that assist SOA composite application development.

**Details** —

**Additional information** —

**Transition statement** — Next: Process integration in the SOA reference architecture

## Process integration in the SOA reference architecture



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Figure 1-7. Process integration in the SOA reference architecture

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### Notes:

The SOA reference architecture is a vendor-neutral way of looking at and planning the set of services that go into building an SOA. One of the principle SOA starting points is process services (discussed in the next topic).

This architecture is not unique to IBM; these are things that you need to consider when approaching SOA regardless of what products and services are used. These capabilities can be implemented on a build-as-you-go basis, allowing capabilities and project-level solutions to be easily added as new requirements are addressed over time. The SOA reference architecture shows the key capabilities that are required for comprehensive, enterprise-wide SOA solutions.

Development services are an essential component of any comprehensive integration architecture. The SOA architecture includes development tools, used to implement custom artifacts. These artifacts leverage the infrastructure capabilities, and business performance management tools, used to monitor and manage the runtime implementations at both the IT and business process levels. Development tools allow people to efficiently complete



specific tasks and create specific output based on their skills, their expertise, and their role within the enterprise.

Business analysts who analyze business process requirements need modeling tools that allow business processes to be charted and simulated. Software architects need tool perspectives that allow them to model data, functional flows, system interactions, and so on. Integration specialists require capabilities that allow them to configure specific interconnections in the integration solution. Programmers need tools that allow them to develop new business logic with little concern for the underlying platform. It is important for each person to have a specific set of tool functions based on their role in the enterprise. In addition, the tooling environment must provide a framework that promotes joint development, asset management, and deep collaboration among all these people. A common repository and functions common across all the developer perspectives (for example, version control functions, project management functions, and so on) are provided in the SOA reference architecture through a unified development platform.

The business innovation and optimization services incorporate monitoring capabilities that aggregate operational and process metrics in order to efficiently manage systems and processes. Managing these systems requires a set of capabilities that span the needs of IT operations professionals and business analysts who manage the business operations of the enterprise. These capabilities are delivered through a set of comprehensive services that collect and present both IT and process-level data. These services allow business dashboards, administrative dashboards, and other IT-level displays to be used to manage system resources and business processes. Through these displays and services, it is possible for line of business and IT personnel to collaborate. Personnel may determine, for example, what business process paths may not be performing at maximum efficiency, the impact of system problems on specific processes, or the relationship of system performance to business process performance. This collaboration allows IT personnel and assets to be tied more directly to the business success of the enterprise than they traditionally have been.

One key feature of the SOA reference architecture is the linkage between the development and the business innovation and optimization services. The ability to deliver run time data and statistics into the development environment allows analyses to be completed that drive iterative process reengineering through a continuous business process improvement cycle.

At the core of the SOA reference architecture is the enterprise service bus. This architectural construct delivers all the interconnectivity capabilities required to leverage and use services implemented across the entire architecture. Transport services, event services, and mediation services are all provided through the ESB. Transport services provide the fundamental connection layer. Event services allow the system to respond to specific stimuli that are part of a business process. Mediation services allow loose coupling between interacting services in the system. The ESB is a key factor in enabling the service orientation of the SOA reference architecture. This architecture is leveraged in implementing service-oriented solutions and can be implemented today to meet the quality of service requirements of any integration solution.

The SOA reference architecture also contains a set of services that are oriented toward the integration of people, processes, and information. These services control the flow of interactions and data among people and automated application services in ways appropriate to the realization of a business process:

Interaction services provide the capabilities required to deliver IT functions and data to users, meeting their specific usage preferences.

Process services provide the control services required to manage the flow and interactions of multiple services in ways that implement business processes.

Information services provide the capabilities required to federate, replicate, and transform data sources that may be implemented in various ways.

Automated application services (implementations of business logic in automated systems) are a critical part of any integration architecture or solution. Many of these services are provided through existing applications; others are provided in newly implemented components; and others are provided through external connections to third-party systems. Existing enterprise applications and enterprise data are accessible from the ESB through a set of access services. These access services provide the bridging capabilities between legacy applications, prepackaged applications, enterprise data stores (including relational, hierarchical, and nontraditional, unstructured sources such as XML and text), and so on, as well as the ESB. Using a consistent approach, these access services expose the data and functions of the existing enterprise applications, allowing them to be fully reused and incorporated into functional flows that represent business processes. Existing enterprise applications and data leverage the business application and data services of their operating environments such as Customer Information Control System (CICS), Information Management System (IMS), DB2, and so on. As these applications and data implementations evolve to become more flexible participants in business processes, enhanced capabilities of their underlying operating environments; for example support of emerging standards, can be fully used.

The SOA reference architecture also contains a set of business application services that provide runtime services required for new application components to be included in the integrated system. These application components provide new business logic required to adapt existing business processes to meet changing competitive and customer demands of the enterprise. Design and implementation of new business logic components for integration enables them to be fully reusable, allowing them to participate in new and updated business processes over time. The business application services include functions important to the traditional programmer for building maintainable, flexible, and reusable business logic components.

In many enterprise scenarios, business processes involve interactions with outside partners and suppliers. Integrating the systems of the partners and suppliers with those of the enterprise improves efficiency of the overall value chain. Partner services provide the document, protocol, and partner management services required for efficient implementation of business-to-business processes and interactions.

Underlying all these capabilities of the SOA reference architecture is a set of infrastructure services which provide security, directory, IT system management, and virtualization functions. The security and directory services include functions involving authentication and authorizations required for implementing, for example, single sign-on capabilities across a distributed and heterogeneous system.

IT services management services include functions that relate to scale and performance. For example, edge services and clustering services; and the virtualization capabilities allow efficient use of computing resources based on load patterns, and so on. The ability to leverage grids and grid computing are also included in infrastructure services.

Many of the infrastructure and IT service management services perform functions tied directly to hardware or system implementations. Others provide functions that interact directly with integration services provided in other elements of the architecture through the ESB. These interactions typically involve services related to security, directory, and IT operational systems management.

The SOA reference architecture is a complete and comprehensive architecture that covers all the integration needs of an enterprise. Its services are integrated and are delivered in a modular way, allowing SOA implementations to start at a small project level. As each additional project is addressed, new functions can be easily added, incrementally enhancing the scope of integration across the enterprise. In addition to supporting SOA strategies and solutions, the architecture itself is designed using principles of service orientation and function isolation.

***Instructor notes:***

**Purpose** — Do not dwell extensively on this slide. There is a great deal of reference text, but the instructor is not expected to cover it all. The main point of the slide is to introduce the role of the process services entry point in the SOA reference architecture. Process services are then detailed in the next topic.

**Details** —

**Additional information** —

**Transition statement** — Next, new topic: SOA development and process management

## **1.2. SOA development and process management**

### **Instructor topic introduction**

## SOA development and process management



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Figure 1-8. SOA development and process management

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: What is Business Process Management?

## What is Business Process Management?



Comprehensive change management of business processes that results in continuous process improvement

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Figure 1-9. What is Business Process Management?

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### Notes:

Companies often seek ways to improve their organization to increase productivity, lower cost, and increase revenues. The challenge organizations face is that change is inevitable in business due to various factors, like market economies. To keep up with the climate of change in business, organizations rely on efficient and effective business processes.

Companies have tried in the past to implement many different strategies to accomplish change management of processes with little to no disruption of customer service and employee productivity. But those efforts either failed outright or only accomplish a portion of the intended process improvement because there was little performance measurement.

Business Process Management (BPM) excels at providing a comprehensive change management of business processes that results in continuous process improvement.



***Instructor notes:*****Purpose —**

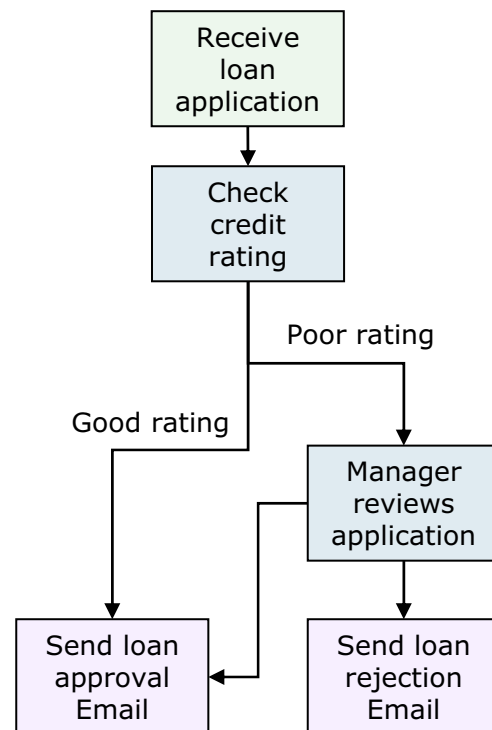
**Details —** BPM is the means by which companies and governments improve their operations by leveraging internal business expertise in new, scalable ways. It is achieved by directly engaging business people in the design, definition, and creation of enterprise-class process applications.

**Additional information —**

**Transition statement —** Next: Business processes and business process management (BPM)

## Business processes and business process management (BPM)

- A **business process** is a collection of service interactions and activities executed to fulfill a business need.
- A business process defines the potential execution order of services:
  - Defines how to coordinate interactions between a process instance and its partners
  - Specifies how to handle errors (faults)
  - Specifies other required technology patterns like compensation
- **Business process management** is a systematic approach to improving an organization's business processes.
  - BPM makes business processes more effective and efficient through a cycle of continuous improvement.



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Figure 1-10. Business processes and business process management (BPM)

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### Notes:

Business process management (BPM) governs the cross-functional core business processes of an organization. It achieves strategic business objectives by directing the deployment of resources from across the organization into efficient processes that create customer value. This focus on driving overall bottom-line success differentiates BPM from traditional functional management disciplines.

In addition, intrinsic to BPM is the principle of continuous improvement, perpetually increasing value generation and sustaining market competitiveness (or dominance) of the organization.

For success in BPM projects, it is critical to use not only SOA-enabled software, but also the expertise to deliver and fulfill the promise of BPM.

***Instructor notes:***

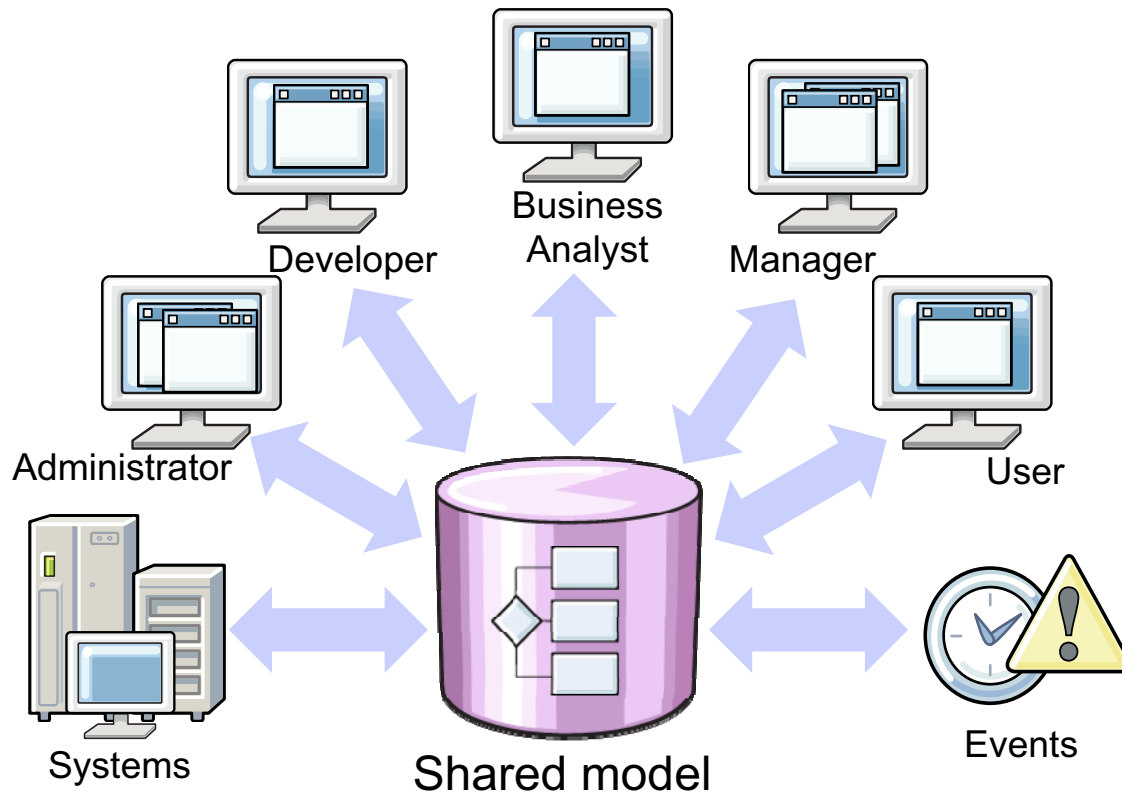
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: The right process model development strategy

## The right process model development strategy



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Figure 1-11. The right process model development strategy

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### Notes:

Business processes are stored in a single shared environment for project design and development. All process artifacts are stored in a single shared model architecture. All parties involved in the effort to define, model, implement, measure, and improve the process are working from a common shared platform that encapsulates all of the various components. It helps keep the vision of bringing business into the same room as IT intact.

The business analyst modeling the process, the IT developers constructing the detailed implementation of the model, the process responsible roles executing the process, and the process owner and analysts who monitor the process performance and identify improvements are all using the same process model. The model of the process built by the analysts and developers is the same one that executes at run time. It is also the same one used to create reports on the performance and status of the process, and the same one used to implement process improvements.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: IBM Business Process Manager: Business value supported by technical capacities

## IBM Business Process Manager: Business value supported by technical capacities

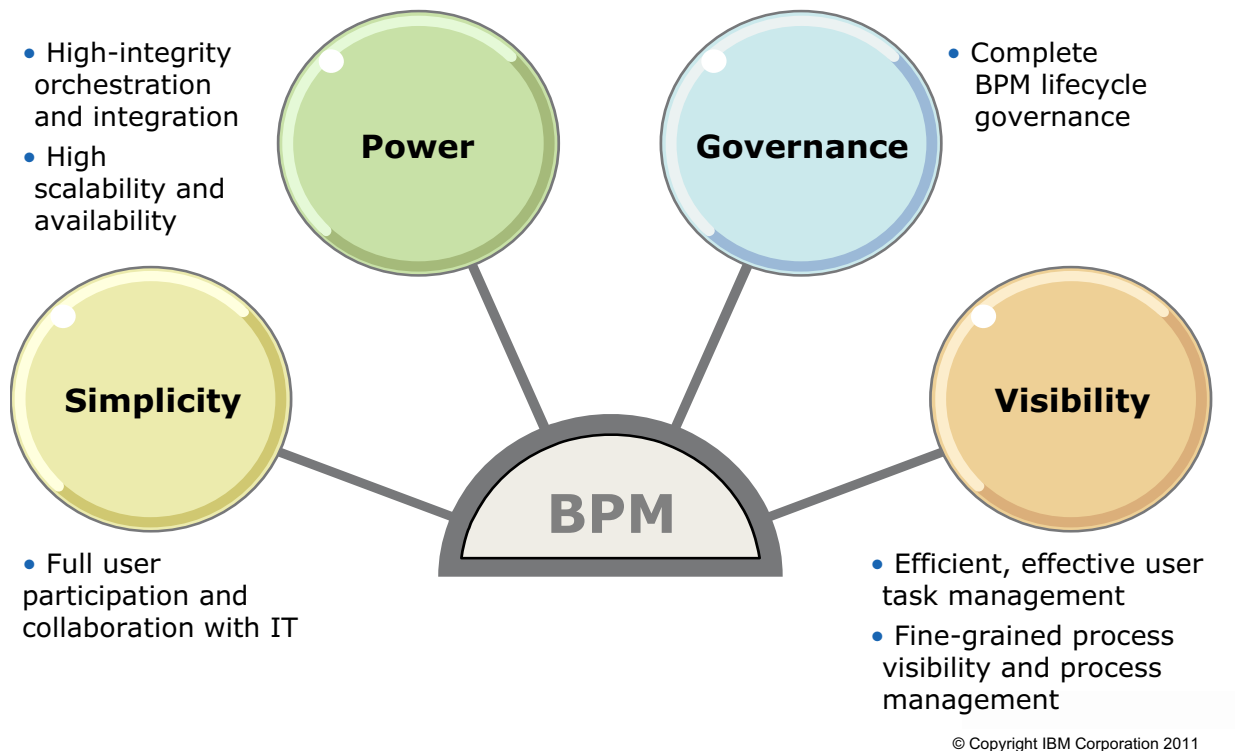


Figure 1-12. IBM Business Process Manager: Business value supported by technical capacities

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### Notes:

The orchestration of the various BPM tools, from IBM Process Designer to IBM Process Server, lends itself to providing a complete business process management solution for any size business. The entire IBM BPM product offers an extensive, comprehensive set of business values from process conception to deployment.

***Instructor notes:***

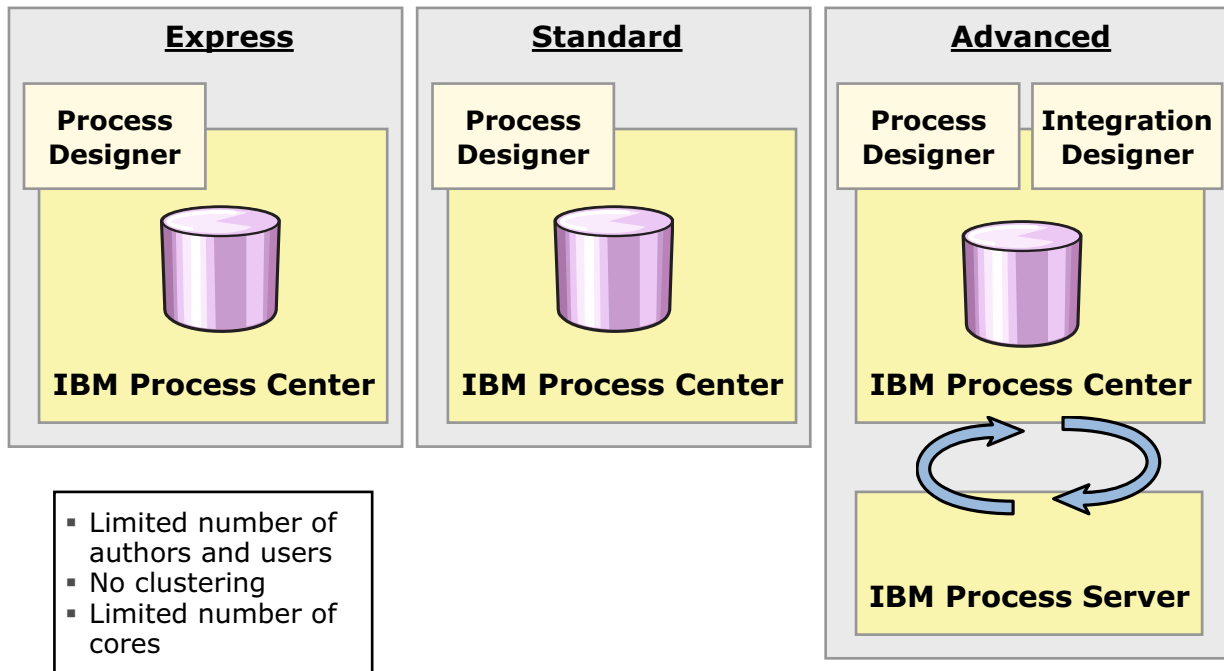
**Purpose** — Purpose

**Details** — Details

**Additional information** — Additional information

**Transition statement** — Transition statement Next: IBM Business Process Manager V7.5 configurations

## IBM Business Process Manager V7.5 configurations



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Figure 1-13. IBM Business Process Manager V7.5 configurations

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### Notes:

The diagram captures the essence of the differences between available configurations of IBM Business Process Manager, but there are several more features which are not depicted:

### IBM Business Process Manager Express V7.5

WebSphere Lombardi Edition compatible execution

- IBM Process Designer (BPMN)
- Collaborative editing
- Interactive “process coach” user interfaces
- ILOG based process rules
- Real-time monitoring and reporting
- Performance analytics & optimizer
- Performance Data Warehouse



- IBM Process Center with shared asset repository
- Limited to 200 users and three authors
- Limited to four production cores and two development cores
- Clustering is not supported

### **IBM Business Process Manager Standard V7.5**

All of the features in the Express configuration, including:

- Unlimited authors and users
- Unlimited cores
- High availability and clustering

### **IBM Business Process Manager Advanced V7.5**

Everything found in the Standard configuration, including:

- IBM Process Server
- IBM Integration Designer
- Built-in enterprise service bus
- Transaction support
- Integration adapters
- IBM Business Space user interface

***Instructor notes:***

**Purpose —**

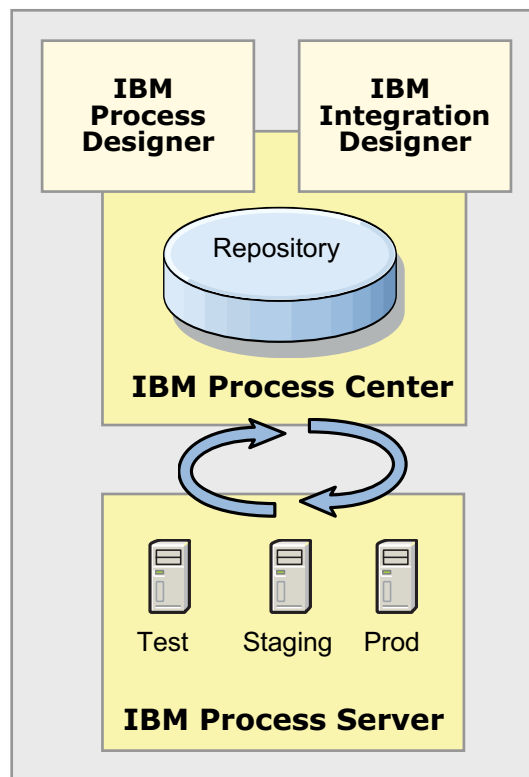
**Details —**

**Additional information —**

**Transition statement —** Next: IBM Business Process Manager Advanced V7.5

## IBM Business Process Manager Advanced V7.5

- Tools for modeling, designing, implementing, and deploying business processes
- Includes:
  - **IBM Process Designer**: an authoring environment used for creating process models which contain automated and human tasks
  - **IBM Integration Designer**: an authoring environment used for creating process models and advanced implementations including mediations, business rules, and human tasks
  - **IBM Process Center**: includes a repository for all processes, services, and other assets created in the authoring environments
  - **IBM Process Server**: provides a single runtime environment for supporting process models, service orchestration, and integration capabilities



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Figure 1-14. IBM Business Process Manager Advanced V7.5

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### Notes:

IBM Business Process Manager is a suite of products which includes a number of tools for working with business processes. These tools are useful for modeling, designing, implementing, and deploying business processes. These tools include IBM Process Designer, IBM Integration Designer, IBM Process Center, and IBM Process Server. To another degree, BlueWorks Live is a utility in the Cloud which may be used for elementary modeling of business processes which may then be imported and designed in IBM Process Designer.

## ***Instructor notes:***

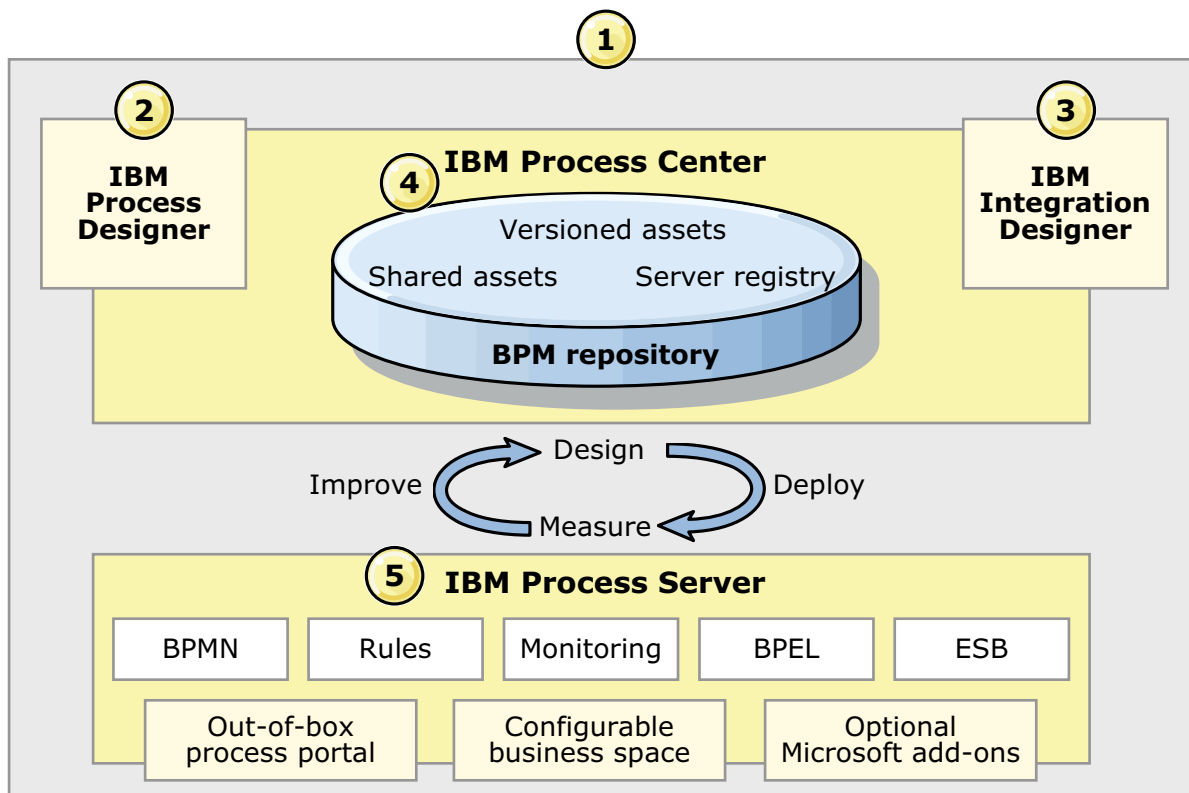
**Purpose** — Purpose

**Details** — Details IBM Business Process Manager V7.5 is the harmonization of WebSphere Integration Developer, WebSphere Process Server, and WebSphere Lombardi Edition.

**Additional information** — Additional information

**Transition statement** — Transition statement Next: IBM Business Process Manager Advanced V7.5

## IBM Business Process Manager Advanced V7.5



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Figure 1-15. IBM Business Process Manager Advanced V7.5

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### Notes:

The tools of IBM Business Process Manager (1) advanced include IBM Process Designer, IBM Integration Designer, IBM Process Center, and IBM Process Server. IBM Process Designer (2) and IBM Integration Designer (3) are authoring environments for creating process applications, services, and implementations of activities in business process applications. IBM Process Center (4) offers a repository wherein development teams may store shared assets, and keep record of them in a server registry. Eventually, these process applications may be deployed to the IBM Process Server (5), a runtime environment supporting several different implementation options (such as BPMN, business rules, BPEL, and ESB). IBM Process Server also offers the ability to integrate with other systems, courtesy of process portals, business spaces, or other add-ons.

***Instructor notes:***

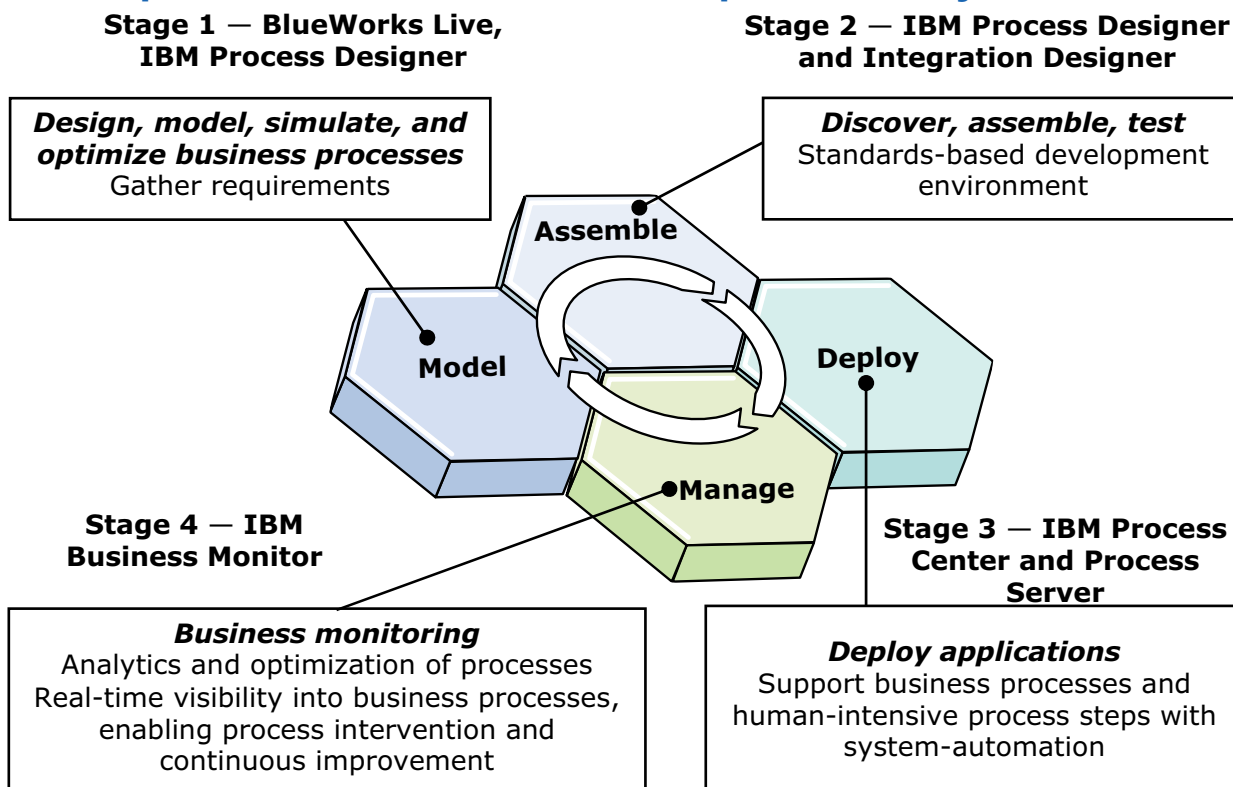
**Purpose** — Purpose

**Details** — Details

**Additional information** — Additional information

**Transition statement** — Transition statement Next: IBM products for the SOA development life cycle

## IBM products for the SOA development life cycle



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Figure 1-16. IBM products for the SOA development life cycle

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### Notes:

IBM delivers end-to-end business process management capabilities that support each stage of the business process life cycle. These products can be used together to complete your SOA vision, or they can be used separately to fill a specific business need.

#### Starting with Stage 1 — Model

**BlueWorks Live:** The purpose of this phase is to ensure that the project you are going to build meets your defined business requirements. IBM provides tools in the Cloud such as BlueWorks Live to evaluate business requirements, to build elementary models, and to simulate business processes.

**IBM Process Designer:** Modeling at the level of BlueWorks Live is considered high level, which does not contain any implementation details or development logic. The business processes which are modeled in the Cloud with BlueWorks Live may then be imported into IBM Process Designer. Once the model is in IBM Process Designer, it can be developed into a more coherent business process (or “process application”) using business process modeling notation (BPMN). BPMN includes rudimentary implementations, conditional logic,

human tasks, and the division of labor with identified teams. IBM Process Designer is a team-based authoring environment.

### Moving to Stage 2 — Assemble

**IBM Process Designer:** In this phase, services are created and linked together to support business processes. IBM Process Designer may be used to link together activities which form a business process, or process application. Each activity in the business process has an implementation. IBM Process Designer supports simple implementations, such as automated activities using JavaScript, human tasks, business rules, or the invocation of external services, such as web services. The development services in the assemble phase allow software architects to model data, functional flows, system interactions, and other processes.

**IBM Integration Designer:** Development teams may build more structured, advanced service components as part of an overall SOA solution. Integration developers use specialized tools to configure interactions between services in the business process.

IBM Integration Designer allows integration developers to take abstract process models and create executable models based on an SOA programming model. Rational Application Developer provides software developers with tools to implement services required by the integration developer.

### Moving to Stage 3 — Deploy

**IBM Process Center:** During this phase, applications which have been built using IBM Integration Designer, or IBM Process Designer, or both, may be stored on a central repository for sharing between environments. Therefore, process applications which have been built in IBM Process Designer may be stored on the repository and imported in to IBM Integration Designer, and the reverse is also true. All development assets are contained in the repository for sharing with the development teams and for easy deployment to the server.

**IBM Process Server:** SOA applications are configured to meet the specific needs of the business and then deployed. IBM provides several products involved in SOA deployment, including IBM Process Server, IBM WebSphere Portal, and IBM Information Server, among others.

### Finally, in Stage 4 — IBM Business Monitor

**Manage:** The manage stage involves establishing and maintaining service availability and response times, as well as managing the underlying service assets of an SOA. Software which IBM provides in this phase includes IBM Business Monitor, IBM Tivoli Composite Application Manager, IBM Tivoli Federated Identity Manager, and IBM Tivoli Access Manager.

Once deployed, customers manage and monitor the composite applications and underlying resources from both an IT and a business perspective. Information gathered during the manage phase is used to gain real-time insight into business processes, enabling better



business decisions and feeding information back into the life cycle for continuous process improvement.

#### Governance:

Underlying all these life cycle stages of SOA projects is SOA governance: the establishment and enforcement of SOA oversight elements such as decision rights, ownership, and management of the service portfolio. IBM supports this crucial set of best practices with software products such as WebSphere Service Registry and Repository, Rational Portfolio Manager, and Rational Method Composer.

Finally, there is the WebSphere Business Services Fabric, a comprehensive platform used to model, assemble, deploy, manage, and govern composite business services. These are collections of business services that work together, along with the existing applications of a client, to provide a specific business solution.

## ***Instructor notes:***

**Purpose** — You may want to introduce WSRR and governance here, but do not spend a great deal of time on them. They are detailed in the student notes.

**Details** — In previous versions of the product, WebSphere Business Modeler was used in the Model phase. Although WebSphere Business Modeler is still available, and may still be used, the product is in a state of deprecation. IBM Process Designer and BlueWorks Live are intended to replace WebSphere Business Modeler.

**Additional information** —

**Transition statement** — Next: Business integration roles in SOA development

## Business integration roles in SOA development

User role	Role definition
Business leader (line of business manager)	<ul style="list-style-type: none"> <li>No programming experience</li> <li>Focus is on business strategy and performance</li> </ul>
Business analyst	<ul style="list-style-type: none"> <li>No programming experience</li> <li>Focus is on business performance, process design, and optimization</li> </ul>
Integration developer	<ul style="list-style-type: none"> <li>Focus is on SOA and EAI solutions, business process automation</li> <li>Some basic programming experience (loops, conditionals, string manipulation)</li> <li>Expects tools to simplify and abstract advanced IT implementation details</li> </ul>
Application developer (IT developer)	<ul style="list-style-type: none"> <li>Focus is on development of application-specific business logic (for example, EJBs, POJOs, COBOL) for components and services used by a business integration solution</li> </ul>
IT architect	<ul style="list-style-type: none"> <li>Defines basic operational imperatives in the provision of IT services with a focus on resiliency, reuse, and adaptability</li> </ul>
BPM solution administrator	<ul style="list-style-type: none"> <li>Focus is on administration, management, and maintenance of deployed business solution</li> </ul>

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Figure 1-17. Business integration roles in SOA development

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### Notes:

The IBM process management tools span the development cycle, allowing increased productivity and communication between different user roles. The definitions of the business integration user roles do not assume a one-to-one relationship. A single person can perform multiple roles. For example, an application developer may also perform the role of integration developer. It is also common for user roles to be involved in several phases of the application development cycle. An example of user roles in various stages of the development life cycle can be found in the appendixes.

***Instructor notes:***

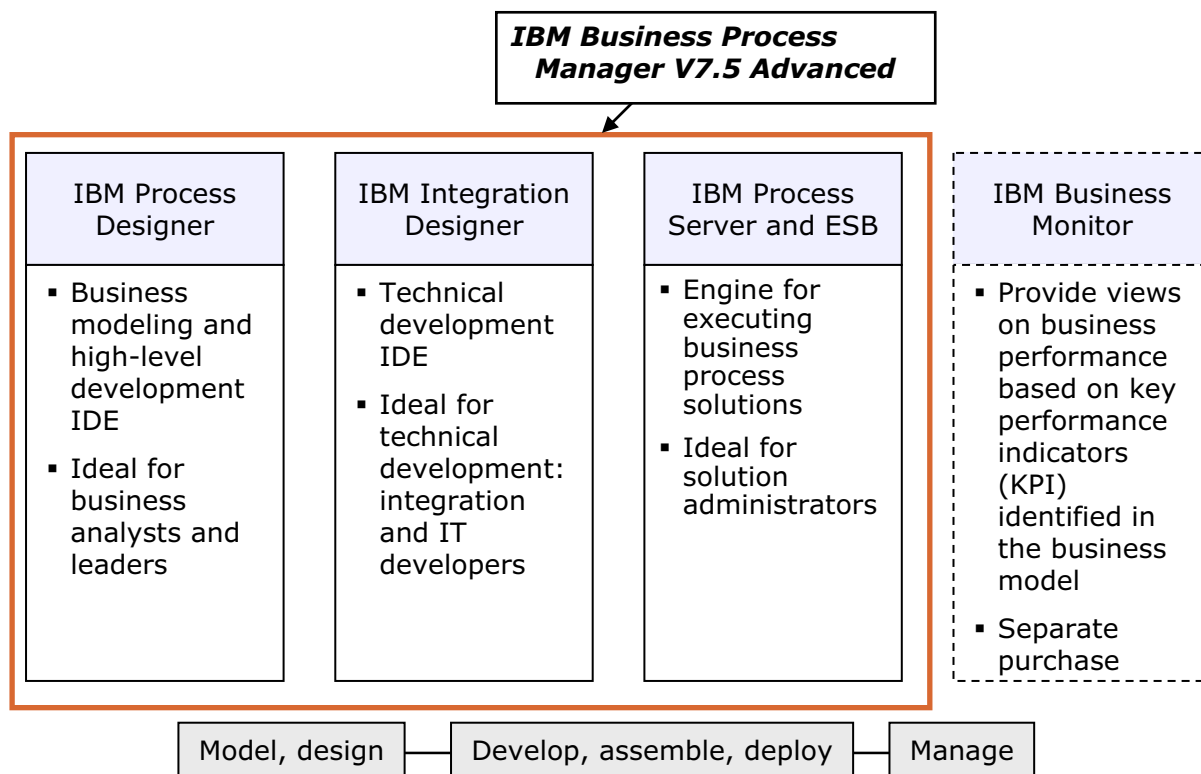
**Purpose** — Do not forget to mention that the main focus of this class is the integration developer role.

**Details** —

**Additional information** —

**Transition statement** — Next: Business integration roles in IBM Business Process Manager

## Business integration roles in IBM Business Process Manager



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Figure 1-18. Business integration roles in IBM Business Process Manager

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### Notes:

IBM Business Process Manager consists of a number of tools, such as IBM Process Designer, IBM Integration Designer, and IBM Process Server with WebSphere Enterprise Service Bus. Each of these tools is used by a specific set of roles, or a “team”, in each stage of the development process. Business analysts and project team leaders, who are part of the “modeling team” may use IBM Process Designer to model and compose high-level implementations of business process diagrams. Integration and IT developers, part of the “development team”, may use IBM Integration Designer for the low-level, highly technical implementation and code required in the development and assembly phase. IBM Process Center (which is not pictured here) may be used as a repository to store the artifacts created by the modeling and development teams. These artifacts can be shared by the teams in order to quickly produce solutions. Solution administrators and integration developers, part of the “deployment team”, may use IBM Process Server and WebSphere Enterprise Service Bus to deploy those solutions to the production server.

IBM Business Monitor, which is purchased separately, may be used to measure performance and to produce optimization reports which feed back in to the development process.

***Instructor notes:***

**Purpose —**

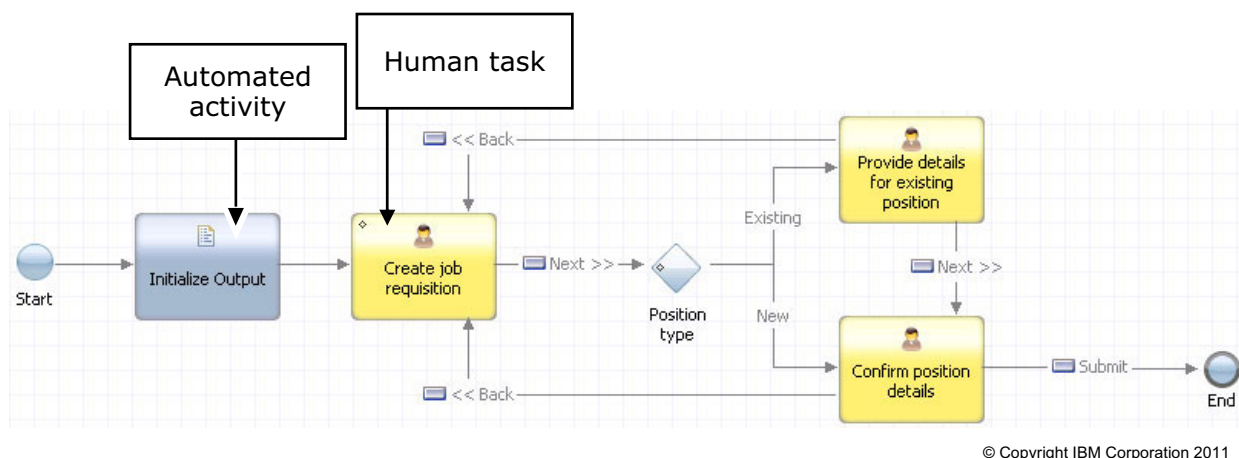
**Details —**

**Additional information —**

**Transition statement —** Next: Interactive process design

## Interactive process design

- Interactive process design supports direct deployment of simple process models to test environments.
  - Provides faster time to value for human workflow applications
  - Business space provided as a client for workflow applications
- Interactive process design gives business users more control.
  - Business user defines, tests processes using Playback Inspector in IBM Process Designer
  - IT assists with problem determination and deploys the application
- Interactive design avoids complex iterative development scenarios.
  - Direct deployment provides shorter path between requirements and executable processes.



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Figure 1-19. Interactive process design

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### Notes:

In previous versions of the WebSphere business process management products, the process life cycle was to model processes in WebSphere Business Modeler. The model was followed by an export to WebSphere Integration Developer (now named IBM Integration Designer) for service assembly before the process module was deployed to a process server.

In IBM Business Process Manager, however, modeling may be accomplished in IBM Process Designer, which is not a separate product, rather it is part of the BPM offering. Process applications built in IBM Process Designer may then be maintained on the IBM Process Center repository. Those artifacts may then be deployed from the repository to IBM Process Server.

Expert development and integration teams, which may choose to use the comprehensive and advanced features available in IBM Integration Designer, may also store their artifacts in the repository to be deployed to IBM Process Server. However, IBM Integration Designer offers a complete, interactive process design scenario where users can directly deploy modules into an IBM Process Server test run time. The process testing environment uses a

number of clients for human task workflows. One such client is Business Space powered by WebSphere. IT acts as a service provider in this scenario, providing web services that can be included in the process. IT can also be brought in for complex problem determination scenarios and debugging. This capability enables business users in the cloud to model or define business processes in BlueWorks Live, which may then be tested in IBM Process Designer. Ideally, the time between requirements and having an executable business process shortens.

Deploying models to production servers is a responsibility that remains with IT. Some configurations, such as the module version, might require modification by an IT developer to conform with IT governance in the production environment. For business process management needs focused on simple, human-centric processes, interactive process design can significantly enhance time to value for business process management applications. More complex processes that require additional capabilities such as binding configuration, business state machines, relationships, mediations, and so on, require modification using IBM Integration Designer. Interactive process design is not a substitute for the capabilities provided by IBM Integration Designer.



***Instructor notes:***

**Purpose —**

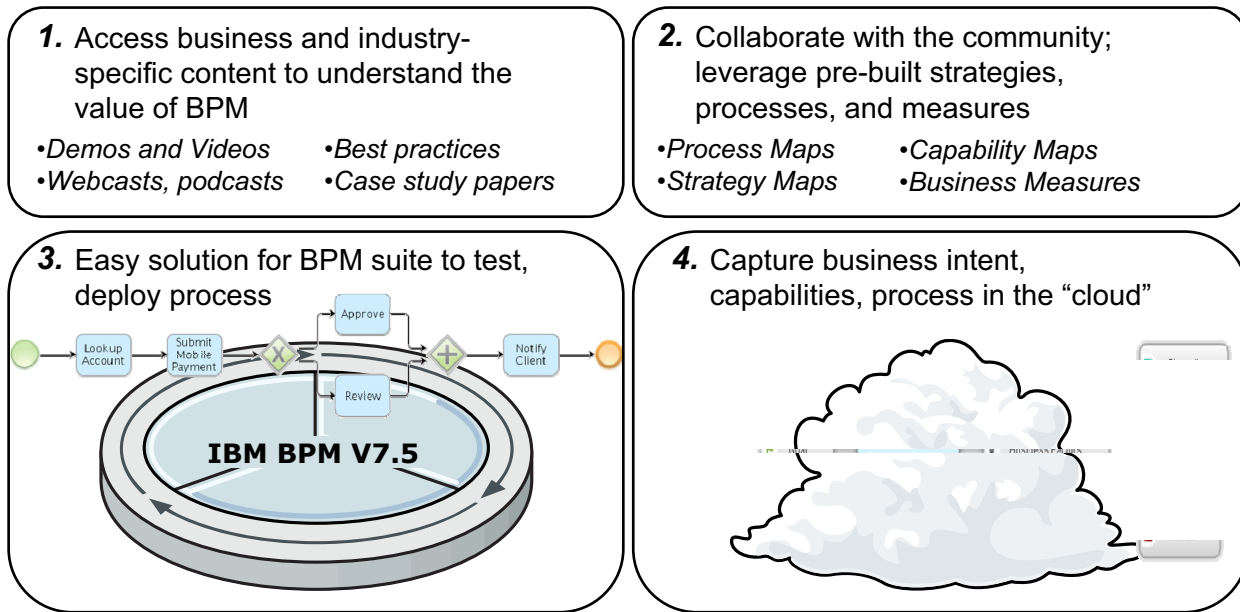
**Details —**

**Additional information —**

**Transition statement —** Next: BlueWorks Live

## BlueWorks Live

- BPM community providing best practices, industry content, and business modeling tools in the “cloud”
  - Quickly, easily acquire expertise, map strategy, execute processes
  - Seamlessly link business strategy to process execution



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Figure 1-20. BlueWorks Live

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### Notes:

BlueWorks Live provides business users an easy starting point to business process management (BPM) with cloud-based process and strategy tools. Business leaders and business analysts can create, share, and collaborate - leveraging pre-built BPM content and contributions from BPM experts and users around the world to move quickly from strategy mapping to process execution. BlueWorks Live is the place for business leaders and business analysts to discover and explore business-relevant content to help them understand, experience, and accelerate business process management (BPM). The goal is to educate you on BPM strategies, trends, capabilities, and best practices, empower through collaborative business design tools and accelerators, and to enable collaboration among the community to help you learn from others.

For more information about BlueWorks, see <https://www.blueworkslive.com/>

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next, IBM Process Center: Enables Scaling from Projects to Programs

## IBM Process Center: Enables Scaling from Projects to Programs

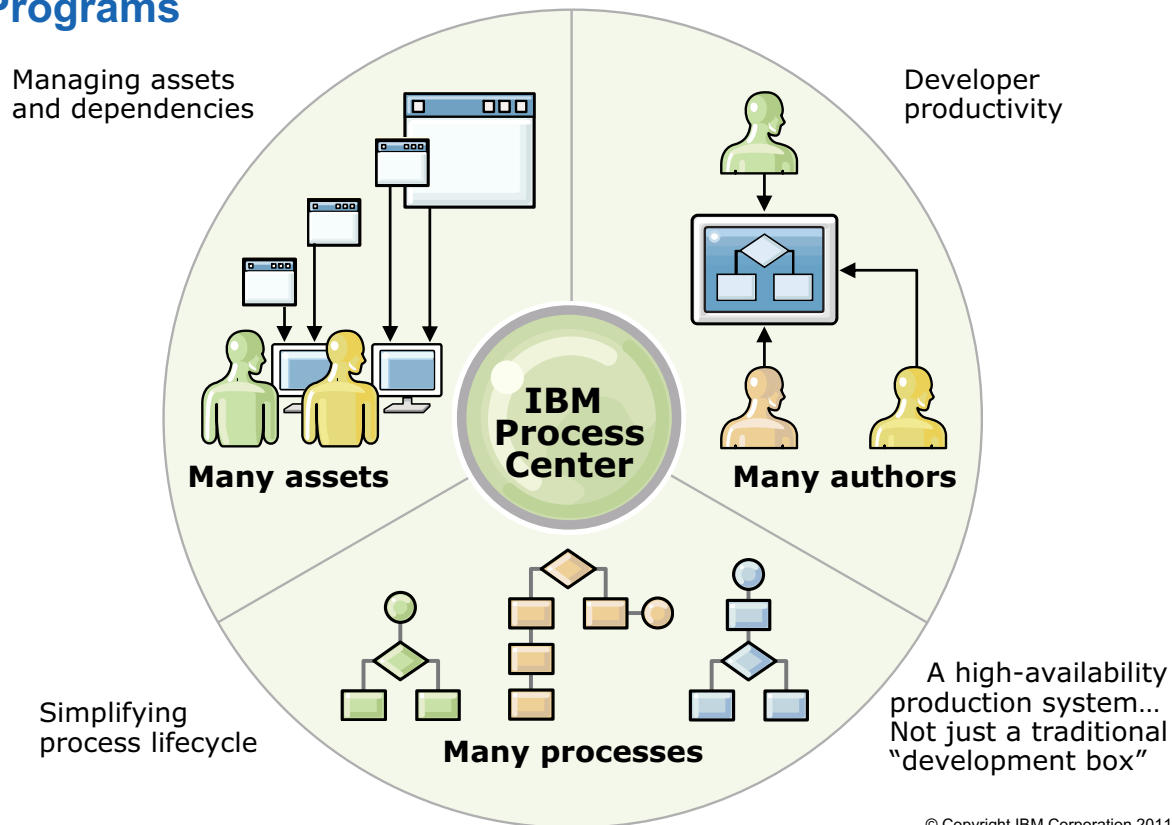


Figure 1-21. IBM Process Center: Enables Scaling from Projects to Programs

WB754 / VB7541.0

### Notes:

IBM Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments (IBM Process Designer and Integration Designer).

IBM Process Center is a run time where assets are shared, in effect allowing developers build business processes cooperatively in a highly interactive manner. These business processes can use monitoring points created with IBM Business Monitor development toolkit. The result is a business process that can be examined at run time for effectiveness under real working conditions. IBM Business Monitor provides a dashboard view with gauges and scorecards. You can add alerts and notifications that let you know from moment to moment how the business process is doing. Bottlenecks, inefficiencies, and errors in resource allocation in a running business process can be spotted and corrected resulting in improving the performance of your business processes.

The IBM Process Center console provides the tools that you need to maintain the repository. From that console, you can create process applications and toolkits and grant other users access to those process applications and toolkits. In the authoring

environments, you can create process models, services, and other assets within process applications. IBM Process Center includes a server and performance data warehouse, allowing users working in the authoring environments to run processes and store performance data for testing and playback purposes.

The console also provides the following features:

- Administrators install process applications that are ready for testing or production on the process servers in those environments,
- Administrators manage running instances of process applications in configured environments,
- Provides a convenient location in which to create and maintain high-level containers such as process applications and toolkits. Administrators who do not actively work in the Designer view can use the console to provide a framework in which BPM analysts and developers can build their processes and underlying implementations. Another primary task for administrators is managing access to the repository by setting up the appropriate authorization for users and groups.

Those users with appropriate authorization can perform some administrative tasks directly in IBM Process Designer and IBM Integration Designer. For example, a developer with write access to the process application who wants to capture the state of all project assets at a particular milestone can create a snapshot while working in the Designer view.

***Instructor notes:***

**Purpose** — Purpose

**Details** — Details

**Additional information** — Additional information

**Transition statement** — Transition statement Next: Development environments

## Development environments

- IBM Process Designer and IBM Integration Designer are two IDEs provided with IBM Business Process Manager V7.5 Advanced
  - IBM Integration Designer is NOT provided with Express or Standard configurations
- Using IBM Process Designer and IBM Integration Designer together:
  - IBM Process Designer is intended for **modeling**, used by business analysts, and development teams for high-level business process solutions
  - IBM Integration Designer is intended for **technical development**, used for low-level business process solutions which offer:
    - Full SOA support
    - Scalability, development power, and reliability
    - Integration with other systems and services
    - Mediation module support for deployment to WebSphere Enterprise Service Bus

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Figure 1-22. Development environments

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### Notes:

IBM Integration Designer is not provided with the Express or the Standard configuration of IBM Business Process Manager. All modeling and development must be performed in IBM Process Designer or another tool.

IBM Business Process Manager Advanced provides two separate development environments, each of which may be used in the development of a business process solution. It is important to use both of these development environments correctly in order to maximize the efficiency of a project.

IBM Process Designer is intended for modeling, which is used by modeling teams, consisting of business analysts and project team managers. IBM Process Designer provides high-level business process diagrams, but does not offer support for mediation or services through an enterprise service bus.

IBM Integration Designer is intended for technical development, which is used by development teams, consisting of IT and integration developers. IBM Integration Designer provides full SOA support, scalability, power, reliability, and integration with enterprise service bus.

Development and modeling teams can share the assets which they produce through IBM Process Center.



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: IBM Business Process Manager Industry Packs

## IBM Business Process Manager Industry Packs

- Accelerate and enhance BPM solution development with an extensive library of assets for the entire BPM life cycle based on industry standards and IBM's best practices.
  - Includes content for Banking, Healthcare, and Telecommunications industries.
- Start proofs of concept and solution implementations quicker with BPM solution templates.
- Reduce risk, increase consistency and reuse with enhanced services, common components and vocabulary based on industry standards.
  - Pre-tested and pre-certified on the WebSphere BPM offerings
- Configure and extend the assets based on your unique business needs.

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Figure 1-23. IBM Business Process Manager Industry Packs

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### Notes:

IBM Business Process Manager Industry Packs is a set of prebuilt, industry-specific assets for all editions of IBM BPM. The BPM Industry Packs integrate seamlessly with the IBM BPM components and provide various assets that help accelerate and enhance BPM solution delivery. The BPM Industry Packs is also extensible and open for configuration and customization based on the key business needs of the organization. BPM solutions based on the BPM Industry Packs can help enterprises to better understand, automate, and optimize their processes, support changing business needs, and increase their competitive edge.

The BPM Industry Packs are pre-tested and pre-certified on the IBM BPM platform to enable consummation and provide ready-to-use industry-specific assets. BPM Industry Packs provide a set of design time and development time assets that help jump-start the delivery of industry-specific BPM solutions. These packs are not packaged applications that can be deployed off-the-shelf to solve a specific business problem. Rather, these are prebuilt assets that can be reused for multiple lines of businesses, regions, processes, and services in a given industry vertical or its subset.

Enterprises adopt industry standards to ensure consistency and encourage reuse; however, consuming a standard in a particular solution is often a challenge. BPM Industry Packs address this challenge by providing IBM BPM assets that can be used to assemble solutions based upon standards. The BPM Industry Packs assets are derived from industry standard definitions and IBM best practices and help customers realize the benefits of consistency and reuse.

The BPM Industry Packs also provide the required discipline that is needed to provide consistent multiple projects with a common architecture and methodology. Their architecture and methodology make it easier to extend BPM solutions based on the dynamic business needs. They also ensure governance across the life cycle of BPM solutions.

The following industry packs are provided:

#### Banking

The BPM Banking Pack focuses on the core banking, front office, and payments capabilities of financial services enterprises. Currently, the available assets are primarily in the Payments segment

#### Healthcare

The BPM Healthcare Pack focuses on the payers, providers, and public health agencies. Currently, the available assets are primarily in the Payer segment.

#### Telecommunications

The BPM Telecom Pack focuses on the operations support systems / business support systems (OSS/BSS) and media life cycle processing areas for telecommunication service providers.

For more information about the industry content packs, including specific artifacts and standards, see the information center at  
<http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/topic/com.ibm.ws.wicp.icmaster.doc/ic-homepage.html>

***Instructor notes:***

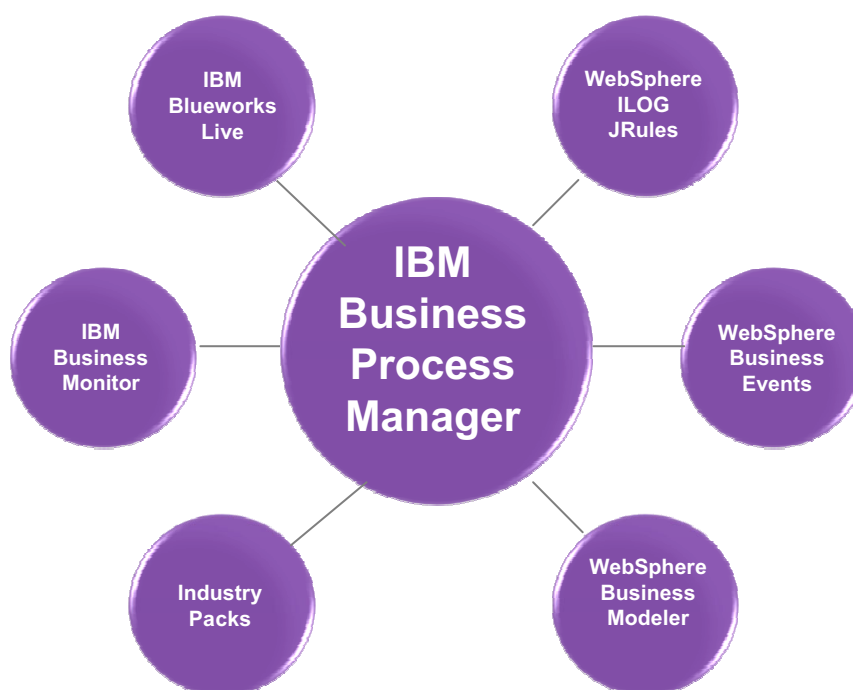
**Purpose** — The purpose of this slide is to introduce the supplemental capabilities provided by the industry content packs. Do not dwell on the information. These capabilities are not discussed in detail in this course.

**Details** —

**Additional information** —

**Transition statement** — Next: Products in broader BPM portfolio

## Products in broader BPM portfolio



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Figure 1-24. Products in broader BPM portfolio

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### Notes:

***Instructor notes:***

**Purpose** — Purpose

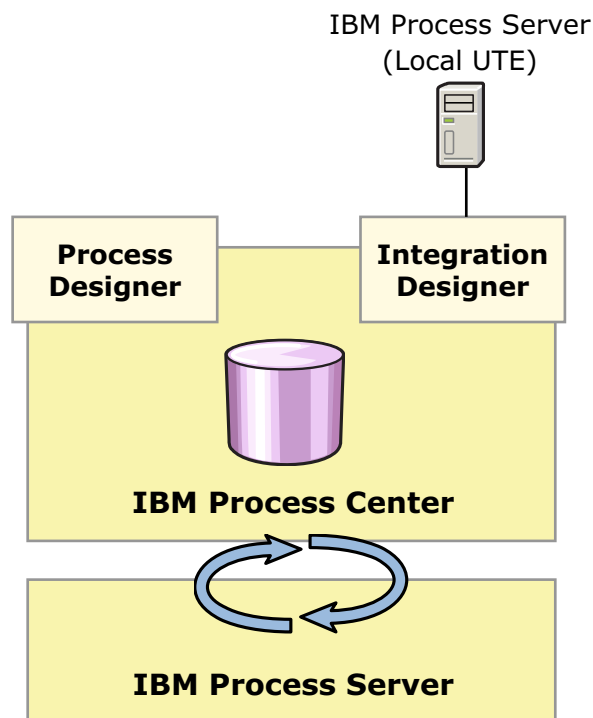
**Details** — Details

**Additional information** — Additional information

**Transition statement** — Transition statement IBM Business Process Manager Advanced V7.5 installation

## IBM Business Process Manager Advanced V7.5 installation

- Typical installation
  - Creates a stand-alone profile for IBM Process Center
  - Can install DB2 Express Edition, and will automatically populate the database
  - Automatically installs IBM Process Designer
  - Creates several administrative shortcuts
- Installation with IBM Process Server and IBM Integration Designer
  - Install IBM Process Center and Process Designer first
  - Use IBM Installation Manager to install IBM Integration Designer separately
  - Create an IBM Process Server profile using Profile Management Tool



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Figure 1-25. IBM Business Process Manager Advanced V7.5 installation

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### Notes:

A typical installation creates a typical stand-alone profile for IBM Process Center in IBM Business Process Manager Advanced. A typical installation can install DB2 Express if an existing database is not specified. DB2 Express is available only for Windows and Linux 32 and 64-bit systems, and the user must be the administrator or root user and must not have another DB2 product installed. The typical installation automatically populates the database. For Windows operating system, this type of installation automatically installs IBM Process Designer, as well as the following shortcuts: IBM Process Center administrative console, Playback Server administrative console, IBM Process Designer, and WebSphere Application Server administrative console.

### Steps in installation:

1. Install IBM Process Center
  - a. Install WebSphere Application Server
  - b. Create WebSphere Application Server profile
  - c. Install DB2 Express or configure database connection

- d. IBM Process Designer and other Process Center tools automatically installed
- 2. Install IBM Process Server
  - a. Create a server profile using the Profile Management Tool
- 3. Install IBM Installation Manager
  - a. Install IBM Integration Designer with IBM Installation Manager
  - b. Configure IBM Integration Designer to use IBM Process Center and IBM Process Server



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: IBM Installation Manager



## **1.3. Overview of IBM Process Server and WebSphere Enterprise Service Bus**

### **Instructor topic introduction**

## Overview of IBM Process Server and WebSphere Enterprise Service Bus



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Figure 1-26. Overview of IBM Process Server and WebSphere Enterprise Service Bus

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next, IBM Process Server: The heart of SOA

## IBM Process Server: The heart of SOA

- IBM Process Server enables simple and flexible execution of standards-based business process management solutions in SOA.
  - Implements WS-BPEL compliant process engine that executes complex business process automation securely, consistently, and with transactional integrity using advanced human workflow, business rules, system-to-system, and B2B capabilities
  - Enables building of composite integration applications
  - Provides high performance and qualities of service with fault tolerance and error-detection capability
  - Includes a prebuilt Web 2.0 business user client (Business Space)
- IBM Process Server provides business value.
  - Provides a comprehensive SOA offering — standards-based
  - Completes the life cycle of business process management as the runtime engine for deployed applications
  - Helps maximize reuse of existing IT assets in SOA

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Figure 1-27. IBM Process Server: The heart of SOA

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### Notes:

IBM Process Server is the runtime environment that makes SOA come alive. You can think of it as the platform or infrastructure that makes assembling an SOA solution possible. IBM Process Server provides the capabilities necessary to link together services in a meaningful way.

As installed, IBM Process Server does not provide you a turnkey system any more than buying a Java EE environment would. IBM Process Server is middleware, an environment, a set of functions that make your life dramatically easier if your challenge or role is the development of SOA-based solutions. Throughout the remainder of this course, as the capabilities of IBM Process Server are illustrated, ask yourself: “How can this task be achieved without IBM Process Server?” In each case, you discover that the solution is significantly easier with IBM Process Server than without. In this course, you discover a number of functions and capabilities. Some of them are applicable in every project; some might only be applicable in a few projects.

***Instructor notes:***

**Purpose —**

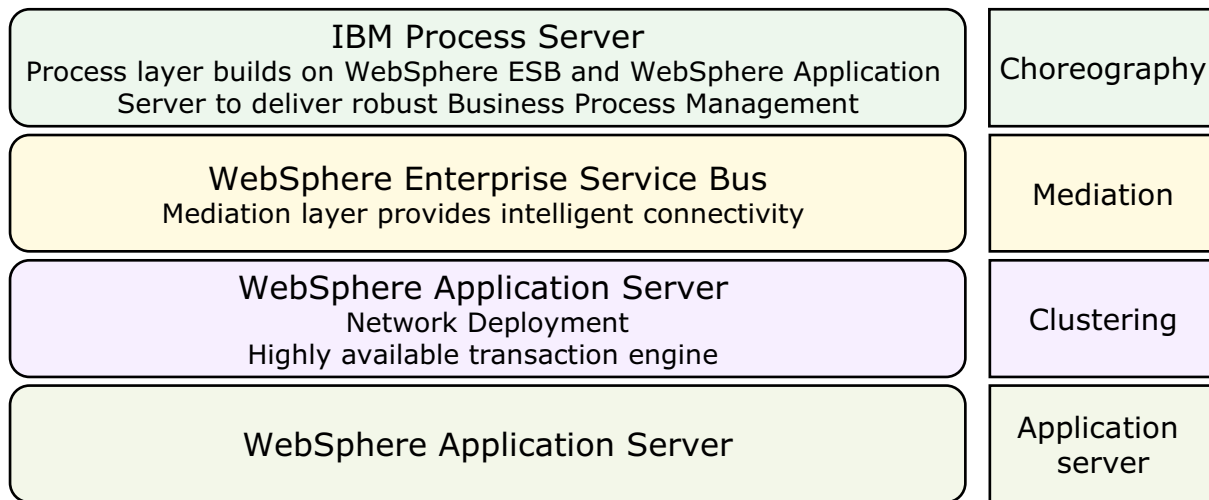
**Details —**

**Additional information —**

**Transition statement —** Next: IBM Process Server foundation

## IBM Process Server foundation

- WebSphere Application Server and Network Deployment provide high availability, workload management, and qualities of service
- WebSphere ESB integration provides a communication infrastructure for integrating services, applications, and data
- IBM Process Server adds business process management functionality to the platform



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Figure 1-28. IBM Process Server foundation

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### Notes:

At the lowest level, IBM Process Server is based on the WebSphere Application Server product. WebSphere Application Server is the IBM platform that implements the Java EE standard and allows applications written on top of it to be portable and efficient. To IBM, Java EE has become a platform-neutral operating system that provides all the richness of functions needed to build and execute applications. Users of Java EE can divest themselves from concerns of security, transaction support, resource management, and much more, and leave those functions to the Java EE environment. In this way, programmers can focus on the wanted business functions.

Although IBM Process Server is itself implemented on top of WebSphere Application Server, Java EE skills are not required to design and implement SOA solutions in IBM Process Server. IBM Process Server provides a higher level of abstraction, hiding the mechanical details underlying its own implementation.

Each layer encapsulates and builds on the lower layer. Everything begins with the application server. The higher abstraction layers indirectly use the application server or WebSphere Application Server Network Deployment for security, user registry,



transactions, scalability, clustering, high availability, failover, platform messaging, and automated deployment.

WebSphere Enterprise Service Bus adds support for ESB service integration points, message mediation flows, and central management of integration logic and integration resources. IBM Process Server adds the capabilities of business process development and choreography.

***Instructor notes:***

**Purpose** — Be sure to emphasize the capabilities leveraged by building IBM Process Server on top of WebSphere Application Server.

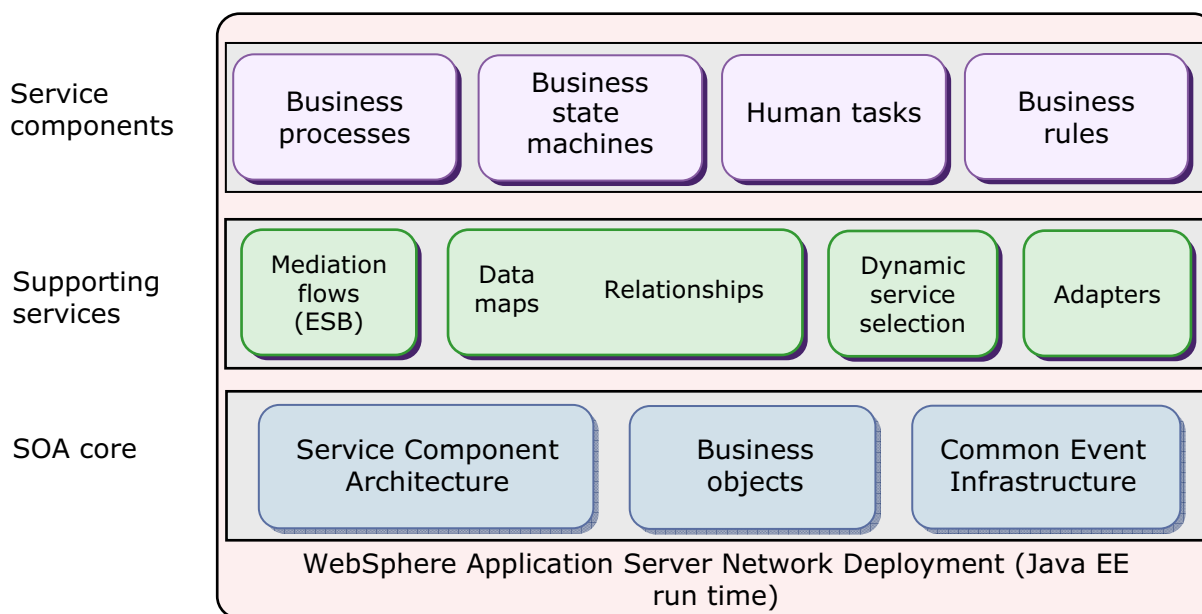
**Details** —

**Additional information** —

**Transition statement** — Next: IBM Process Server components

## IBM Process Server components

- IBM Process Server adds process management components to the WebSphere platform and includes WebSphere Enterprise Service Bus mediation capabilities.



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Figure 1-29. IBM Process Server components

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### Notes:

If you were to ask yourself what it would take to build an SOA solution, you would find that the functions provided as part of IBM Process Server are all necessary at some time or another. Beyond the basic WebSphere Application Server functions, the power of IBM Process Server starts to build on a set of logical services that IBM terms the SOA core. It is a set of logical services that provide the core foundation on which SOA functions are based.

Within the SOA core are three major components called the Service Component Architecture, business objects, and the Common Event Infrastructure. Service Component Architecture (SCA) provides a universal invocation model with well-defined interfaces and encapsulation into modules. Business objects, extensions of Service Data Objects (SDO), provide an abstraction layer for data objects. Lastly, the Common Event Infrastructure (CEI) allows for monitoring of components and services within the IBM Process Server platform.

The second row describes a set of services that support process integration. Mediation flows transform data from one service into an acceptable format for a subsequent service.

Data maps transform one type of business object to another object. Relationships maintain relationships between business objects across disparate systems. Dynamic service selection includes the dynamic service selection capabilities of mediation primitives and selectors. Selectors dynamically select services based on a runtime condition, such as a date. Adapters extract data and transaction information from cross-industry and industry-specific packaged applications and connect them to a central server.

The first row, service components, represents run time service artifacts in IBM Process Server. IBM Process Server provides a WS-BPEL compliant process engine to run business processes. The human task component provides a service for assigning and managing human tasks in a business process. Business state machines allow another way of modeling business processes using states and events as opposed to the graph-oriented approach of business processes. Business rules externalize often changing business policies into a database and allow you to alter the rules at run time.

***Instructor notes:***

**Purpose** — The purpose here is for you to identify the logical organization of the IBM Process Server architectural components. You are not meant to define them here as they are defined in later units.

**Details** — Selectors, interface maps, and business object maps have been deprecated in V7. The discussion of selectors and relationships is in WB712. Business object maps have been replaced with data (XML) maps except for relationships which still require a business object map.

**Additional information** —

**Transition statement** — Next: WebSphere Enterprise Service Bus

## WebSphere Enterprise Service Bus

- WebSphere Enterprise Service Bus is the IBM, open-standards based ESB runtime environment
  - Mediations intercept messages between service requesters and providers
  - Centralizes logic to handle events, route, transform, convert data
  - Provides Web service connectivity, JMS messaging, and service-oriented integration (SOI)
  - Changing business needs met through dynamic selection, substitution, matching
  - Decouples the point-to-point connections from interfaces
  - Enables reuse, flexible coupling and decoupling of applications

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Figure 1-30. WebSphere Enterprise Service Bus

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### Notes:

WebSphere ESB delivers an enterprise service bus that connects applications with standards-based interfaces in order to power your SOA. WebSphere ESB supports the integration of service-oriented, message-oriented, and event-driven technologies to provide standards-based, messaging infrastructure to companies wanting a fast start to an enterprise service bus.

WebSphere ESB includes the following capabilities towards deploying an ESB solution:

Web services connectivity, JMS messaging, and service-oriented integration: WebSphere ESB delivers smart integration to connect your assets through service-oriented interfaces and standards-based protocols. WebSphere ESB handles and manages the integration logic required for service interactions. It allows the flow of business events and adds needed intelligence to that flow. Within WebSphere ESB, in-flight processing of information (transformation, and so on) is referred to as mediation.

Ease of use: The development tool, IBM Integration Designer, is easy to use and requires minimal programming skills. You do not have to know Java in order to use this tool. It is integrated, interactive, and provides a visual development experience. Using the tools, it is

simple to develop, build, test, deploy, and manage mediations. Easy-to-understand samples are also included.

Improved time to value: You can save time and development costs by using prebuilt mediations such as XML transformation, content based routing, and message logging. You can dynamically reconfigure mediations to meet changing business needs.

Seamless integration with the WebSphere platform: You can incorporate mediations within business processes by deploying such processes to IBM Process Server, which is built on WebSphere ESB. WebSphere ESB is built on the WebSphere Application Server: a world-class Java EE foundation providing industry-leading levels of availability, scalability, and performance. Also, WebSphere ESB can tightly integrate with IBM Tivoli security and systems management offerings.

***Instructor notes:***

**Purpose —**

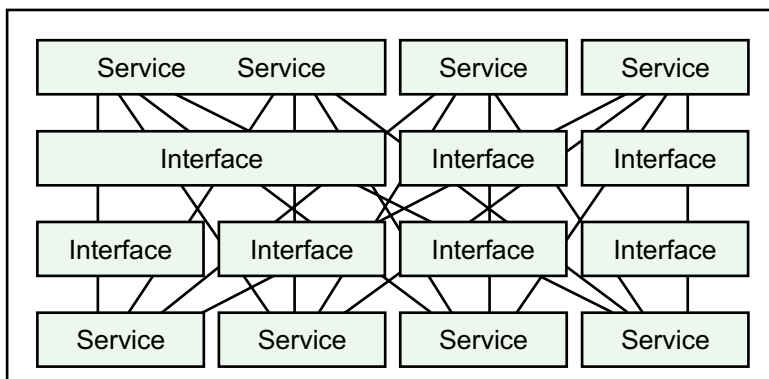
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**Additional information —**

**Transition statement —** Next: Advantages of WebSphere ESB

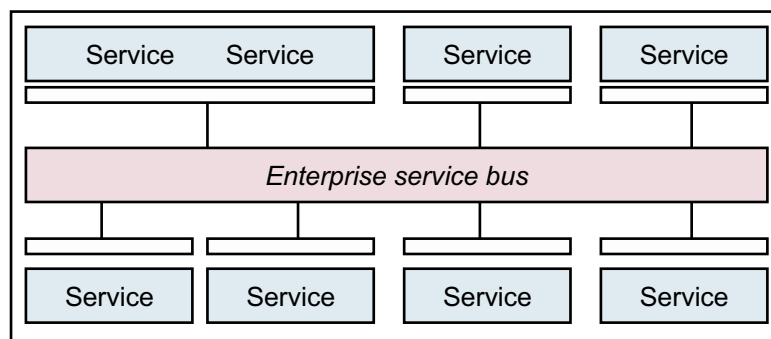


## Advantages of WebSphere ESB



Turns point-to-point...

...into a dynamic, flexible architecture



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Figure 1-31. Advantages of WebSphere ESB

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### Notes:

The ESB is, in a way, an architectural best practice for implementing an SOA and enabling its features, such as ease of service integration or flexible service associations. Layered on top of these basic features are many other quality of service capabilities such as transaction handling, security, or reliable messaging. The ESB allows a service consumer to change providers without impacting the consumer, for example. In this way, new service providers can be integrated into the enterprise application with minimal effort.

***Instructor notes:***

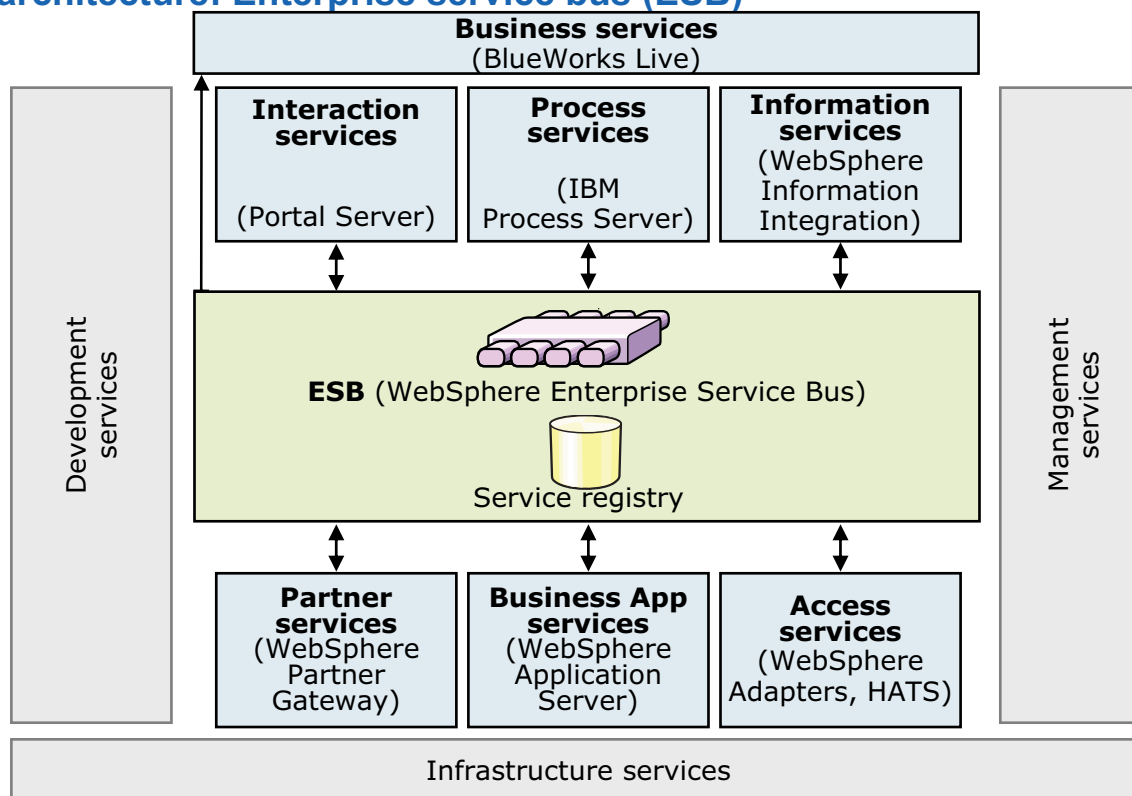
**Purpose** — Purpose

**Details** — Details

**Additional information** — Additional information

**Transition statement** — Transition statement Next: Moving data between applications in the SOA reference architecture: Enterprise service bus (ESB)

## Moving data between applications in the SOA reference architecture: Enterprise service bus (ESB)



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Figure 1-32. Moving data between applications in the SOA reference architecture: Enterprise service bus (ESB) WB754 / VB7541.0

### Notes:

At the core of the SOA reference architecture is the enterprise service bus. This architectural construct delivers all the interconnectivity capabilities required to use services implemented across the entire architecture. Transport services, event services, and mediation services are all provided through the ESB. Transport services provide the fundamental connection layer. Event services allow the system to respond to specific stimuli that are part of a business process. Mediation services allow loose coupling between interacting services in the system. The ESB is a key factor in enabling the service orientation of the SOA reference architecture to be leveraged. The architecture is leveraged by implementing service-oriented solutions and can be implemented today to meet the quality of service requirements of any integration solution.

Automated application services (implementations of business logic in automated systems) are a critical part of any integration architecture or solution. Many of these services are provided through existing applications; others are provided in newly implemented components; and others are provided through external connections to third-party systems. Existing enterprise applications and enterprise data are accessible from the ESB through a set of access services. These access services provide the bridging capabilities between

legacy applications, prepackaged applications, enterprise data stores (including relational, hierarchical, and nontraditional, unstructured sources such as XML and text), and the ESB. Using a consistent approach, these access services expose the data and functions of the existing enterprise applications, allowing them to be fully reused and incorporated into functional flows that represent business processes. Existing enterprise applications and data leverage the business application and data services of their operating environments such as CICS, IMS, DB2, and so on. As these applications and data implementations evolve to become more flexible participants in business processes, enhanced capabilities of their underlying operating environments (for example, support of emerging standards) can be fully realized.

Many of the infrastructure and IT service management services perform functions tied directly to hardware or system implementations. Others provide functions that interact directly with integration services provided in other elements of the architecture through the ESB. These interactions typically involve services related to security, directory, and IT operational systems management.

***Instructor notes:***

**Purpose** — Do not dwell extensively on this slide. There is a great deal of reference text, but the instructor is not expected to cover it. The main point of the slide is to introduce the role of an enterprise service bus in the SOA reference architecture.

**Details** —

**Additional information** —

**Transition statement** — Next: Unit summary

## Unit summary

Having completed this unit, you should be able to:

- Explain the purpose of service-oriented architecture and the evolution toward SOA
- Define services in the SOA context
- List and describe the open standards that support SOA
- Describe the concepts of business processes and business process management
- Explain the various stages of SOA application development
- Describe the IBM products that support SOA application development
- Create a basic business process diagram using the basics of Business Process Modeling Notation (BPMN)
- Describe the purpose, advantages, and business value of using IBM Process Designer, IBM Process Server, IBM Process Center, IBM Integration Designer, and WebSphere Enterprise Service Bus

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Figure 1-33. Unit summary

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### Notes:

***Instructor notes:*****Purpose —**

**Details —** Encourage open discussion, and have students to share their experiences and challenges with business integration. All topics need to be discussed briefly since more detail is provided as the course progresses.

**Additional information —** Additional information

**Transition statement —** Next: Checkpoint questions

## Checkpoint questions

Your instructor reviews these questions with you as a group. The instructor may provide you time to answer the questions on your own before the group discussion. Place your answers in the space provided.

1. Which of the following advantages to service-oriented integration is false?
  - a) Less expensive to implement and maintain
  - b) Brittle; requires extensive development to introduce new systems
  - c) Reusability and interoperability through standard (WSDL) interfaces
2. Which of the following statements about an SOA service is false?
  - a) A self-contained entity that performs a distinct business function
  - b) Defined with explicit interfaces that do not expose implementations
  - c) Defined by interfaces that provide the contract with service requesters
  - d) Can be combined with other services, but is not reusable

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Figure 1-34. Checkpoint questions

WB754 / VB7541.0

### Notes:

Write your answers here:

1.

2.

Suggested answers are included after the following page of additional questions.



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Checkpoint questions

## Checkpoint questions (continued)

Your instructor reviews these questions with you as a group. The instructor may provide you time to answer the questions on your own before the group discussion. Place your answers in the space provided.

3. True or false: SOA uses SDO to represent data, SCA to model service invocation, and BPEL to choreograph processes.
4. Arrange the four stages of the SOA life cycle:
  - a) Assemble
  - b) Deploy
  - c) Manage
  - d) Model
5. True or false: IBM Integration Designer supports the manage stage of the SOA life cycle.

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Figure 1-35. Checkpoint questions (continued)

WB754 / VB7541.0

### Notes:

Write your answers here:

3.

4.

5.

Suggested answers are included on the next page.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Checkpoint solutions

## Checkpoint answers

1. **(b)** Service-oriented integration is less expensive to implement and to maintain; SOA is less brittle; standard (WSDL) interfaces allow effective reuse and interoperability.
2. **(d)** A self-contained entity that performs a distinct business function; defined with explicit interfaces that do not expose specific implementations (such as the programming language or deployment platform); defined by interfaces that provide the contract with service requesters; an application and business function packaged in a simple and standardized way; a component that can be reused or combined with other services to address new opportunities or changing business priorities; is based on open standards.
3. **True.**
4. **(d), (a), (b), (c).**
5. **False.** Primarily the assembly stage, but also the modeling stage to a lesser extent. The managing stage is handled by IBM Process Server, or the preferred method is IBM Business Monitor.

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Figure 1-36. Checkpoint answers

WB754 / VB7541.0

### Notes:

***Instructor notes:***

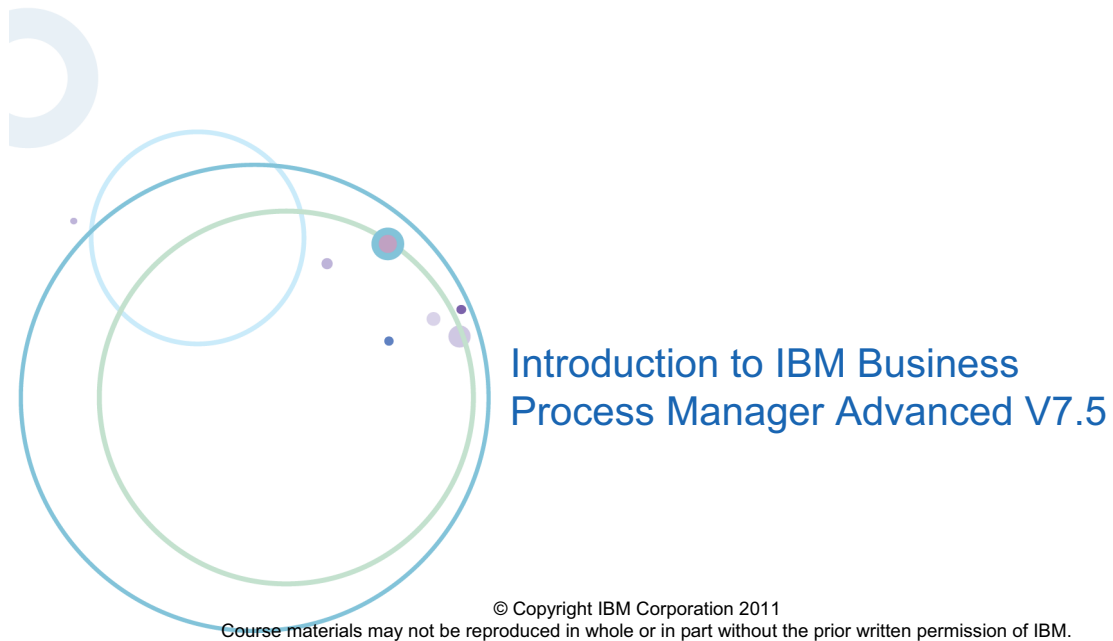
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Exercise

## Exercise



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Figure 1-37. Exercise

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Exercise objectives

## Exercise objectives

After completing this exercise, you should be able to:

- Launch the IBM Process Center server
- Launch IBM Process Designer
- Navigate the IBM Process Designer perspectives
- Launch IBM Integration Designer
- Examine IBM Integration Designer capabilities and preferences
- Navigate the business integration perspective and views
- Examine the modules and libraries of a business integration project
- Navigate the IBM Integration Designer graphical editors
- Launch IBM Process Server
- Deploy modules to IBM Process Server

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---

Figure 1-38. Exercise objectives

WB754 / VB7541.0

### **Notes:**



***Instructor notes:***

**Purpose** — Introduce the lab exercise.

**Details** — Exercise 1 includes instructions on launching the VMware image. Instructors must review the first section of the exercise and inform students if any of the VMware sections need to be completed.

**Additional information** —

**Transition statement** — Next, Exercise environment: VMware

## Exercise instructions: VMware

- The products covered in this course are installed on a VMware image.
  - VMware is a virtual machine, a working operating system that interacts with the host machine operating system.
  - VMware is similar to running another personal computer on your personal computer
  - VMware is not an IBM product and does not come with the products used in this class. The use of VMware in this course is intended for educational purposes only.
- The operating system used for the VMware image in this class is Windows XP Professional.
- Use VMware Player in full screen mode to ensure that you use the VMware operating system for your exercises.
  - Do not confuse the VMware operating system with your host computer operating system.
- Because of the processor usage of running a virtual machine on your system, IBM products installed in VMware run more slowly than when installed on the host computer.

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Figure 1-39. Exercise instructions: VMware

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Exercise recap

## Exercise recap

1. Before using IBM Process Designer, you must:
  - a) Log in to IBM Process Center
  - b) Install IBM Process Designer on a local machine
  - c) Launch the IBM Process Center server
  - d) All of the above
2. Which function is not available with the Snapshots view?
  - a) Export
  - b) Deploy
  - c) Edit
  - d) Activate
3. True or false: Inspector is used to optimize the performance of your business process application by monitoring key performance indicators (KPIs).

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Figure 1-40. Exercise recap

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### Notes:

Write your answers here:

1.

2.

3.

Suggested answers are included on the next page.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Exercise recap answers

## Exercise recap answers

1. (d) IBM Process Designer is a locally installed, Eclipse-based development environment which must securely connect to a running IBM Process Center repository.
2. (c) Import and export, deploy and undeploy, and archive are all available functions from the Snapshots view
3. **False.** Playback sessions in the Inspector help capture important information from different stakeholders in a process, such as management, users, and business analysts. An entire development team can use the Inspector in IBM Process Designer to demonstrate current process design and implementation in playback sessions.

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Figure 1-41. Exercise recap answers

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: References

## References

- IBM WebSphere Business Process Management information center:
  - <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/index.jsp>
- BPM - Business Process Management
  - <http://www.ibm.com/software/info/bpm/>
- IBM Business Process Manager home page:
  - <http://www.ibm.com/software/integration/business-process-manager/>
- IBM Business Process Manager on developerWorks:
  - <http://www.ibm.com/developerworks/websphere/zones/bpm/>

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Figure 1-42. References

WB754 / VB7541.0

### Notes:



***Instructor notes:***

**Purpose** — Purpose

**Details** — Details

**Additional information** — Additional information

**Transition statement** — Transition statement



## Unit 2. Business process modeling

### Estimated time

00:45

### What this unit is about

In this unit, you are introduced to the IBM Process Designer tool, which is used to build business process models.

### What you should be able to do

After completing this unit, you should be able to:

- Describe how IBM Business Process Manager is used to accomplish process modeling goals
- Explain how to create and modify process applications in IBM Process Center
- Explain how to create and modify process models using the Designer view of IBM Process Designer
- Describe how to validate process models using the Inspector view of IBM Process Designer
- Describe the purpose of the Process Portal

### How you will check your progress

- Checkpoint
- Machine exercise

## Unit objectives

After completing this unit, you should be able to:

- Describe how IBM Business Process Manager is used to accomplish process modeling goals
- Explain how to create and modify process applications in IBM Process Center
- Explain how to create and modify process models using the Designer view of IBM Process Designer
- Describe how to validate process models using the Inspector view of IBM Process Designer
- Describe the purpose of the Process Portal

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Figure 2-1. Unit objectives

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Topics

- Process modeling and IBM Business Process Manager
- The Process Center
- IBM Process Designer (Designer, Inspector, and Optimizer views)
- The Process Portal

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Figure 2-2. Topics

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**





## **2.1. Process modeling and IBM Business Process Manager**

### **Instructor topic introduction**

## Process modeling and IBM Business Process Manager



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Figure 2-3. Process modeling and IBM Business Process Manager

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### Notes:

As discussed earlier, process modeling is a three-phased approach: descriptive, analytical, and executable. Business Process Management tools must strive to meet those objectives in process modeling and also fit within the parameters of agile development and collaboration between business and IT. This topic covers the best tool for accomplishing those objectives: IBM Business Process Manager.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Importance of process modeling

- Process modeling helps businesses achieve three common themes:
- **Goal**
  - Model an efficient business process with visibility
  - Solve a defined business problem
- **System**
  - Manage work steps
    - Human tasks
    - Automated tasks
    - Interactive (human and computer) tasks
- **Results**
  - Generate process improvement
  - Improvements measurable in financial benefits
  - Improved customer and employee satisfaction

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Figure 2-4. Importance of process modeling

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### Notes:

Why do businesses need process modeling? To achieve three common themes: to reach a **goal**, to manage the **system**, and to generate **results**. Business process management (BPM) is the means by which companies and governments improve their operations by leveraging internal business expertise in new, scalable ways. It is achieved by directly engaging business people in the design, definition, and creation of enterprise-class process applications.

***Instructor notes:***

**Purpose —**

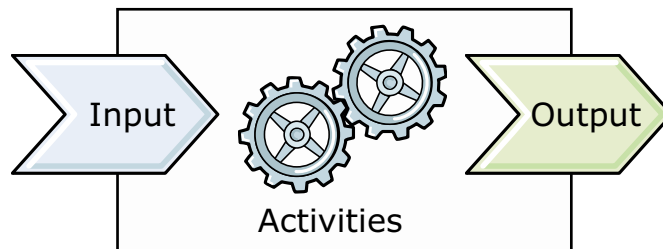
**Details —**

**Additional information —**

**Transition statement —**

## The business process model

- Convert specific inputs into specific output by:
  - Passing inputs through a set of activities
  - Assembling activities in a well-defined, predictable fashion
  - Transforming information (inputs) into decisions (outputs)
- The process model
  - Captures the ordered sequence of the activities
  - Identifies tasks for people and systems
  - Recognizes the roles responsible for performing activities
  - Considers conditional branching
  - Supports the information (input) from start to end



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Figure 2-5. The business process model

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### Notes:

A business process is a set of tasks or activities that takes specific inputs and converts them into specific outputs in an intended, predictable fashion. Inputs are typically information or a set of information which triggers a set of activities in the process. Outputs are the decisions rendered by the set of activities.

Process modeling captures:

- The ordered sequence of the business process tasks or activities
- The responsible roles performing the activities
- Conditional branching
- The sequencing of the flow of work between activities along with the supporting information from start to end

***Instructor notes:***

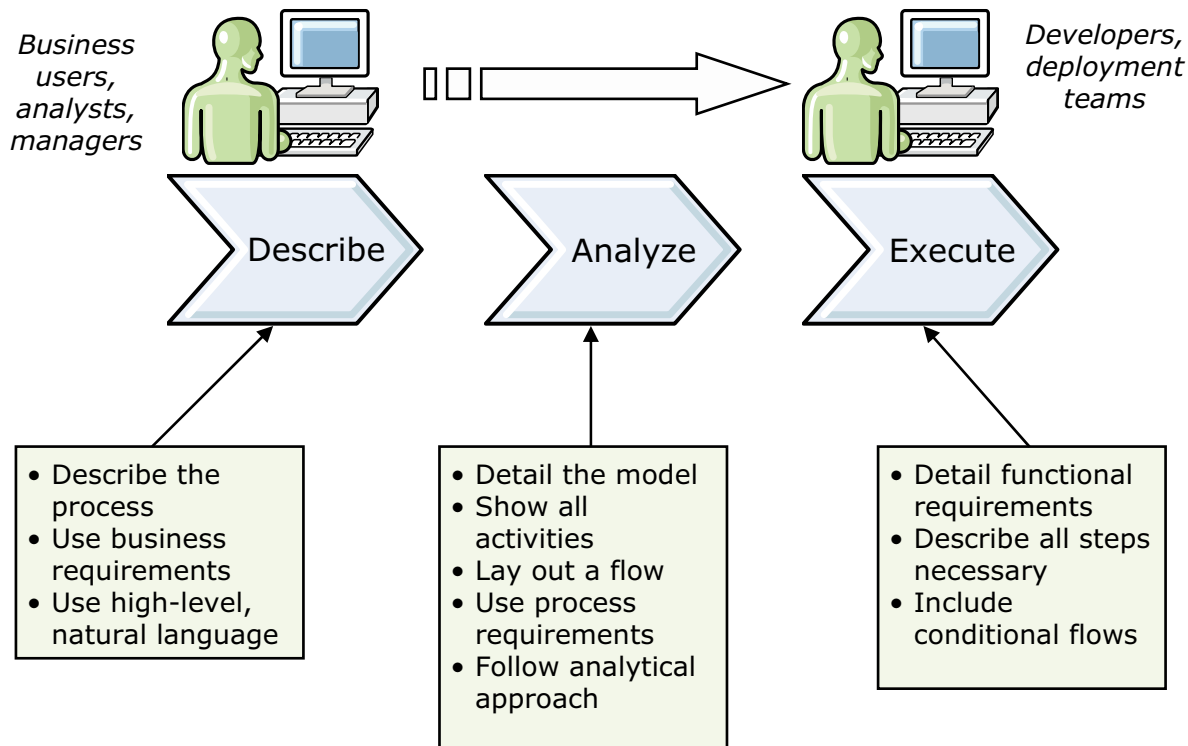
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## High-level modeling approach



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Figure 2-6. High-level modeling approach

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### Notes:

Process modeling can be described as having three distinct phases:

#### Descriptive phase:

High-level model describing the process based on business requirements that is easily communicated across the organization

#### Analytical phase:

Analytical, more detailed modeling, showing all pertinent activities and flow used to detail process requirements

#### Executable phase:

A model that details the functional requirements to implement the executable process application



***Instructor notes:***

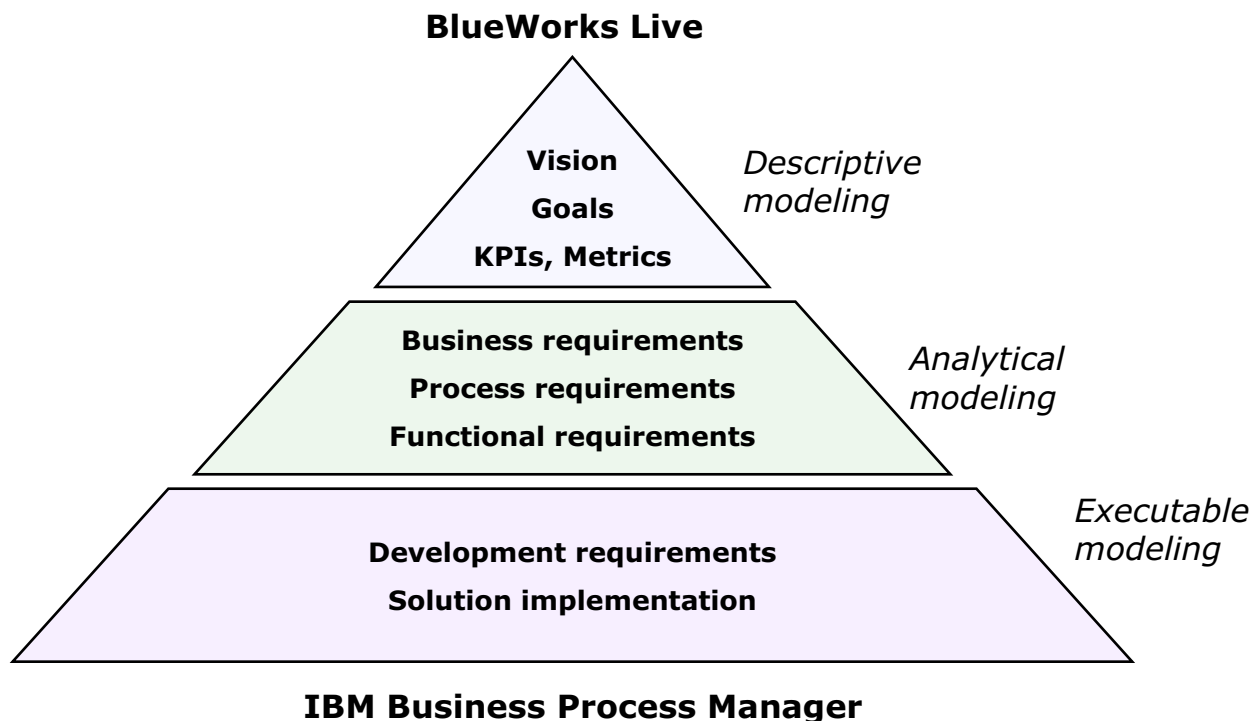
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Business Process Manager and process modeling



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Figure 2-7. IBM Business Process Manager and process modeling

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### Notes:

The first phases of the BPM lifecycle require a BPM team to designate business process candidates, discovery, and initial definition of the process. It is therefore appropriate to choose the best tools to accomplish these tasks. One of the best in market tools for discovery and initial definition of a process is Blueworks Live. Eventually, a BPM team is required to migrate to a tool that handles the adjustments and refinement of the process model on the way towards execution. Remember that it is best to think of a shared model approach to maintain a central artifact to modify and improve the process. IBM Business Process Manager excels at the shared model approach. It is important to note that tools do not have a clear demarcation where one stops and the other begins in terms of the process modeling. That varies from project to project; however, Blueworks Live and Business Process Manager work together to engage the business and information technology (IT) sides of an organization. Business Process Manager offers the ability to efficiently handle key components of a BPM project and the three phases of Process Modeling. Part of the functional charter of good BPM project development involves a strategy called “playback”. Playbacks provide the opportunity for business people to collaborate and be involved in the

modeling phases and to validate work or adjust requirements in the implementation of the model.

For purposes of this course, you start modeling in IBM Business Process Manager in the analytical modeling effort. This course is not to be interpreted that where you start is where every process modeling effort must begin.

***Instructor notes:***

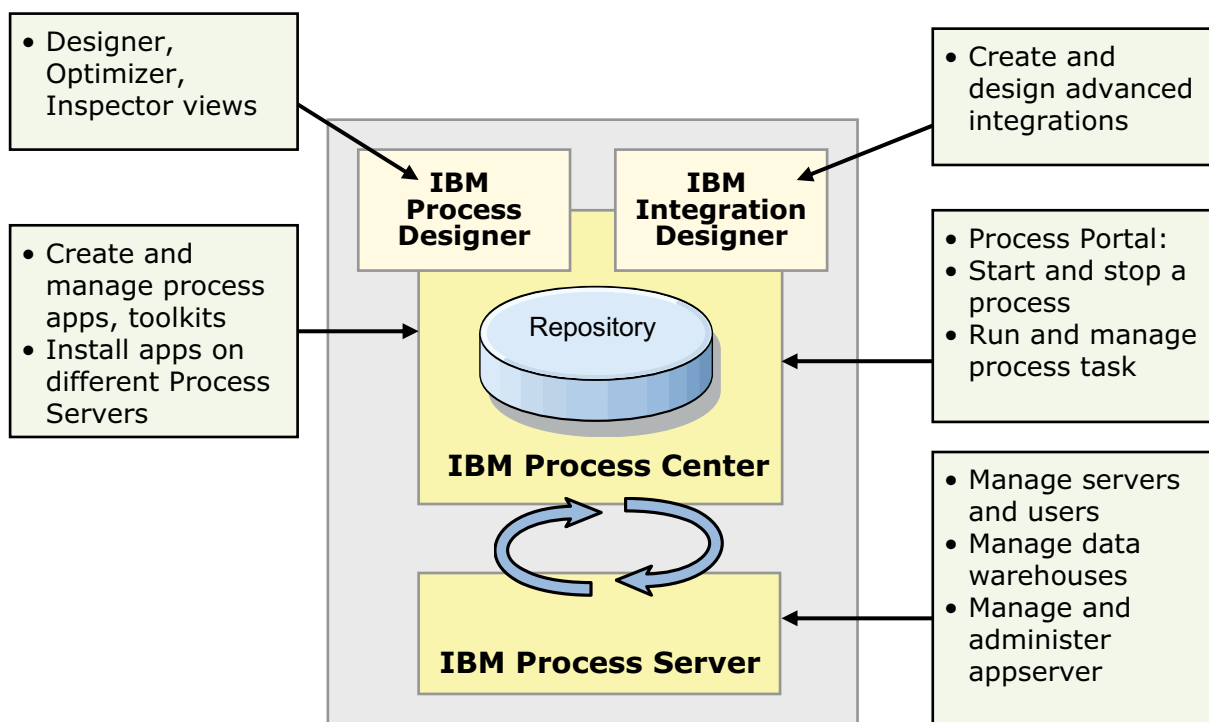
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Business Process Manager



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Figure 2-8. IBM Business Process Manager

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### Notes:

IBM Business Process Manager is an enterprise application that:

- Allows you to build faster, work smarter, and constantly improve your business process model
- Employs a graphical process development tool, Process Designer
- Provides process visibility and performance data
- Provides process simulation and optimization
- Provides an interface console for user productivity

To understand how the product features are enabled in Business Process Manager, you have to understand the individual tool components. Tool components are categorized in the following way:

- Authoring – how would an author create the process application using this tool
- Administration – how would a project administrator manage process application development and deployment

- Production – how would a user and management use the process application and monitor process performance data

In the diagram, the three categories have specific applications within the tool to accomplish all three objectives in the best way. For all the categories, and how the IBM Business Process Manager tool is configured, not all three configurations for Business Process Manager have the same applications or the same level of fidelity for each application. For example, for the Express and Standard configuration, there is no Integration Designer provided. For Express, there is a limitation in author and process participant access because of the usage pattern for this configuration. There is also a server limitation in terms of cores for Express, as well as no clustering. Again, it is viable because of how Express is used in the BPM journey that an organization usually undertakes.

For this course, the Authoring and Production applications are highlighted because each provides a good overview of how Business Process Manager provides the best features for process modeling and for project development overall.

***Instructor notes:***

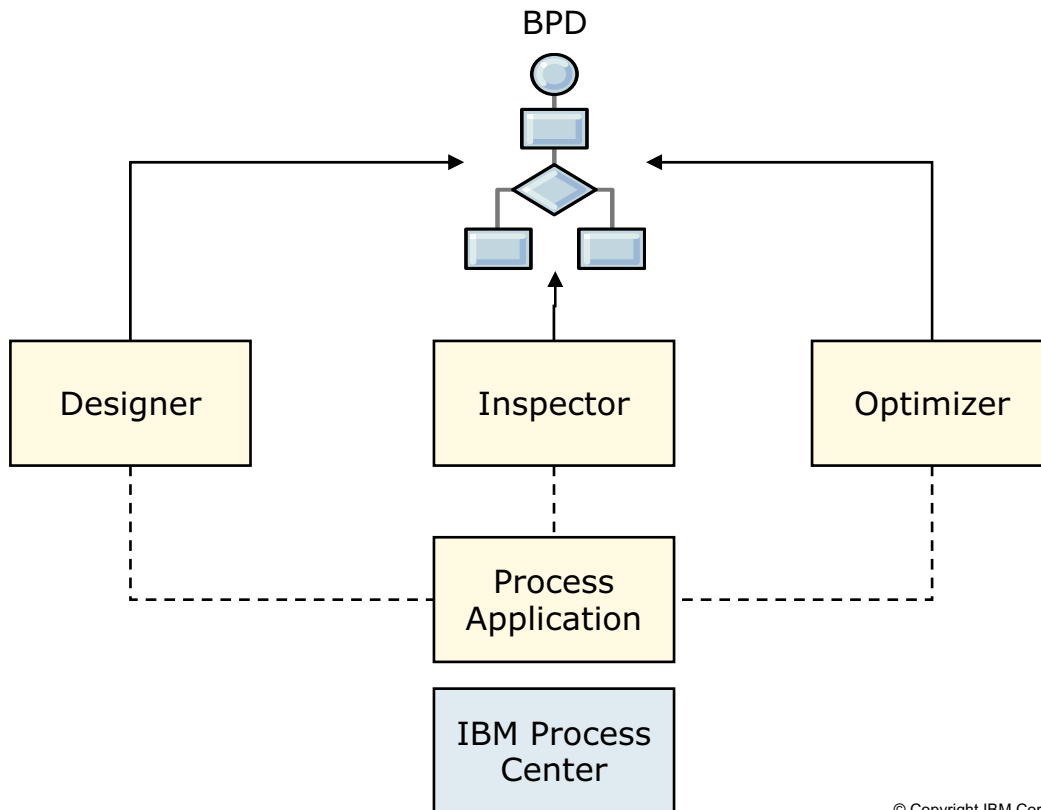
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Process Designer



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Figure 2-9. IBM Process Designer

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### Notes:

Process modeling in IBM Business Process Manager is accomplished through the Process Designer views or interfaces. These interfaces allow developers or authors to create, manage, test, and optimize process models. When modeling a process in the Process Designer, project teams are creating a Business Process Definition (BPD). A BPD is the reusable shared model of a process, defining what is common to all runtime instances of that process model.

IBM Process Designer is composed of three key interfaces:

- Designer – this interface of the process designer allows authors to create, modify, and implement business process models and services
- Inspector – project development authors can test process models at any time during modeling and implementation efforts in order to check and debug each business process definition



- **Optimizer** – this interface allows project development teams to evaluate the executable process model either in a simulated set of business process scenarios or through historical data gathered after deployment

To access these interfaces, an author would go through the central repository, the Process Center and open or create a process application.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## **2.2. IBM Process Center**

### **Instructor topic introduction**

## IBM Process Center



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Figure 2-10. IBM Process Center

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### Notes:

The unique design environment of IBM Business Process Manager includes a central repository called the Process Center. This topic covers the Process Center essentials.

***Instructor notes:***

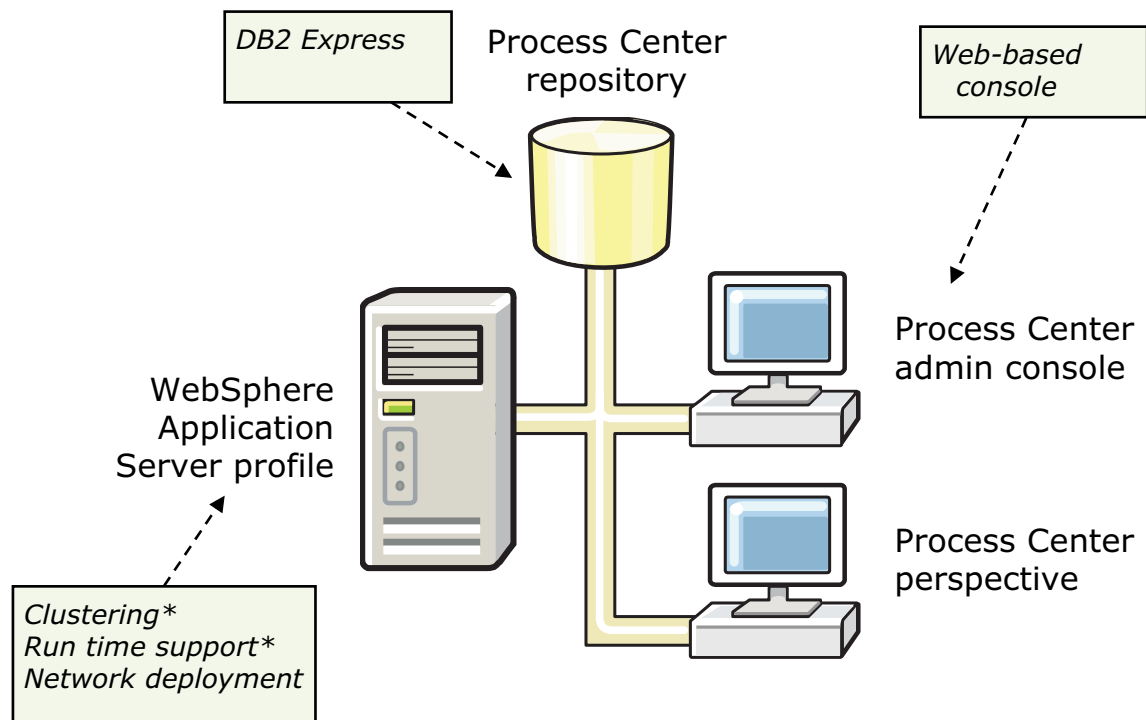
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## About IBM Process Center



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Figure 2-11. About IBM Process Center

WB754 / VB7541.0

### Notes:

IBM Process Center is a centralized tool which uses WebSphere Application Server and a database as a repository. IBM Process Designer and IBM Integration Designer offer perspectives to work with assets stored in the Process Center repository. The pieces of IBM Process Center include:

#### Application server

- A WebSphere Application Server profile which offers all the expected functionality of WebSphere Application Server network deployment, including clustering, and a run time engine. In the Express configuration of IBM Business Process Manager, clustering is not supported. IBM Process Center is used as the run time engine for the Express and Standard configurations, but not for the Advanced configuration. In the Advanced configuration, IBM Process Server is the run time engine.

#### Database

- IBM Process Center uses a repository which, by default, is based upon DB2 Express. The repository may be installed on other databases at installation time.

**Administration console**

- IBM Process Center offers a web-based administration console which may be launched from a browser. This same interface is also offered in development tool perspectives (IBM Process Designer and IBM Integration Designer)

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## Advantages of IBM Process Center

- Repository capabilities:
  - Stores business process assets
  - Keeps monitor models for process optimization
  - Maintains snapshots of assets
  - Offers central governance of assets
- Execution environment:
  - Includes a WebSphere Application Server profile
  - Controls application assets throughout life cycle
  - Manages dependencies, versions, and other related assets
  - Deploys to development, testing, and production servers

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Figure 2-12. Advantages of IBM Process Center

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Process Center: end to end governance

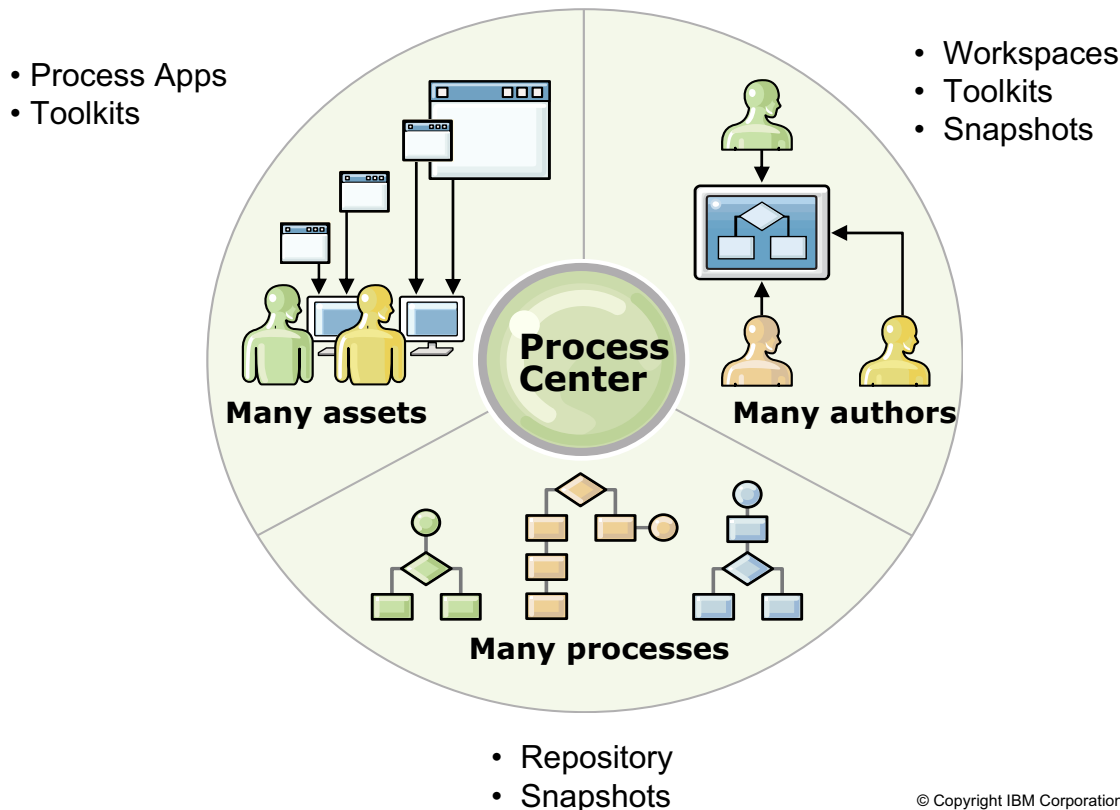


Figure 2-13. Process Center: end to end governance

WB754 / VB7541.0

### Notes:

The Process Center provides project development teams a shared development platform and an end-to-end governance of process applications to mitigate typical application development problems. The Process Center allows for the management of the different process applications created for specific projects along with the assets for each. The Process Center includes a Process Center Server and a Performance Data Warehouse, allowing you to build and run process applications and also store process performance data for testing and playback purposes during development efforts.

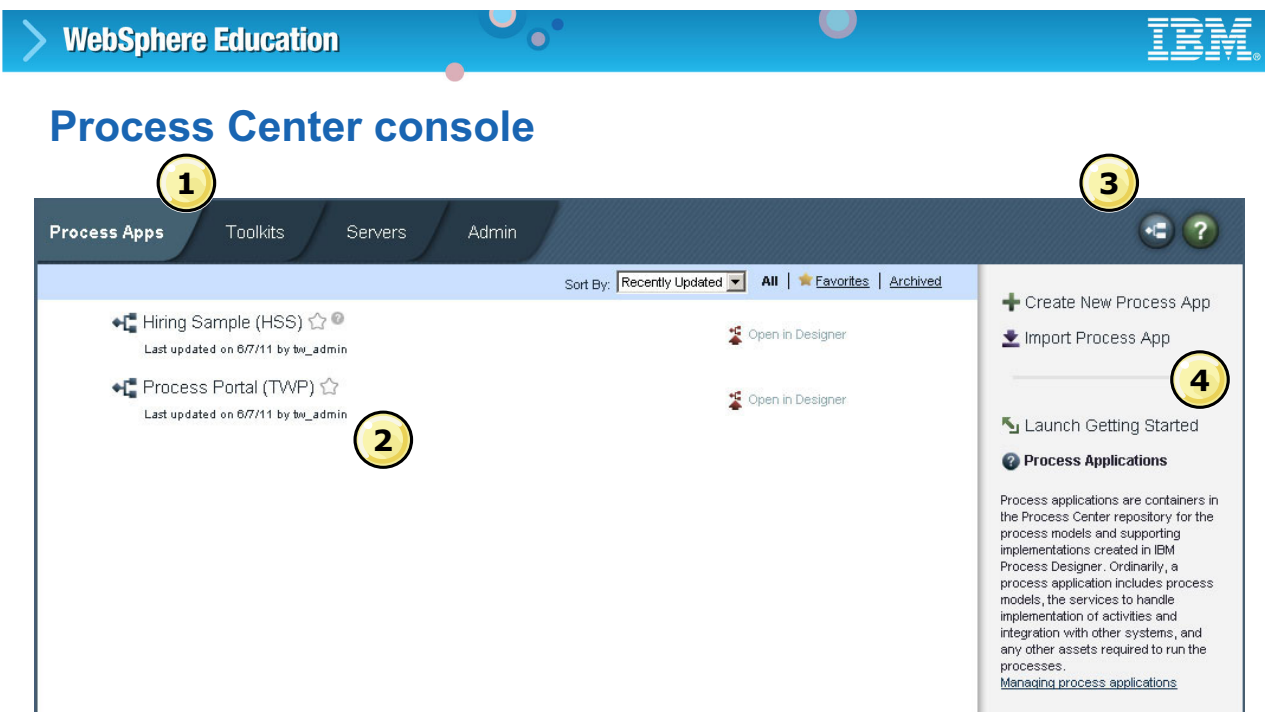
***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



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Figure 2-14. Process Center console

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## Notes:

To accomplish the creation and management to process applications, as well as author access management, a project team would use the Process Center console. The console is a web-based interface that provides all the project management functionality for development groups.

1) The Process Center console provides four main interfaces to work with:

**Process Apps** – a repository of process applications available for a project development team with their associated assets, such as snapshots

**Toolkits** – a listing of toolkits created by authors that are available for use. Authors can also create new toolkits using the Process Center console in the same way they can create new process applications.

**Servers** - From the Process Center console, repository administrators can install snapshots of process applications on connected Process Servers. The servers shown in the Server interface are the Process Servers that are connected to the Process

Center either after installation or as offline servers added later. For each server, you can see the process application snapshots that are currently installed.

Admin – specific login enabled access to this interface in the Process Center console allows administrators to manage access to the Process Center repository and all the corresponding assets

2) The process center console provides a listing of options available for each of the different interfaces, from access of process application snapshots to management of environment servers.

3) To switch from the Process Center to the Process Designer application, click the Process Designer button on the upper right corner of the application. Switching to the Process Designer automatically jumps to the last process application used in Designer. To open a specific process application, select the process application first in the Process Apps list. Then, click the button or the “Open in Designer” icon on the far right.

4) For each interface, there are select functions that can be applied. For example, “Create New Process App” in the Process App interface, or the “Open in Designer” function when a process application is highlighted in the repository. Support information is also provided in this quadrant of the application.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

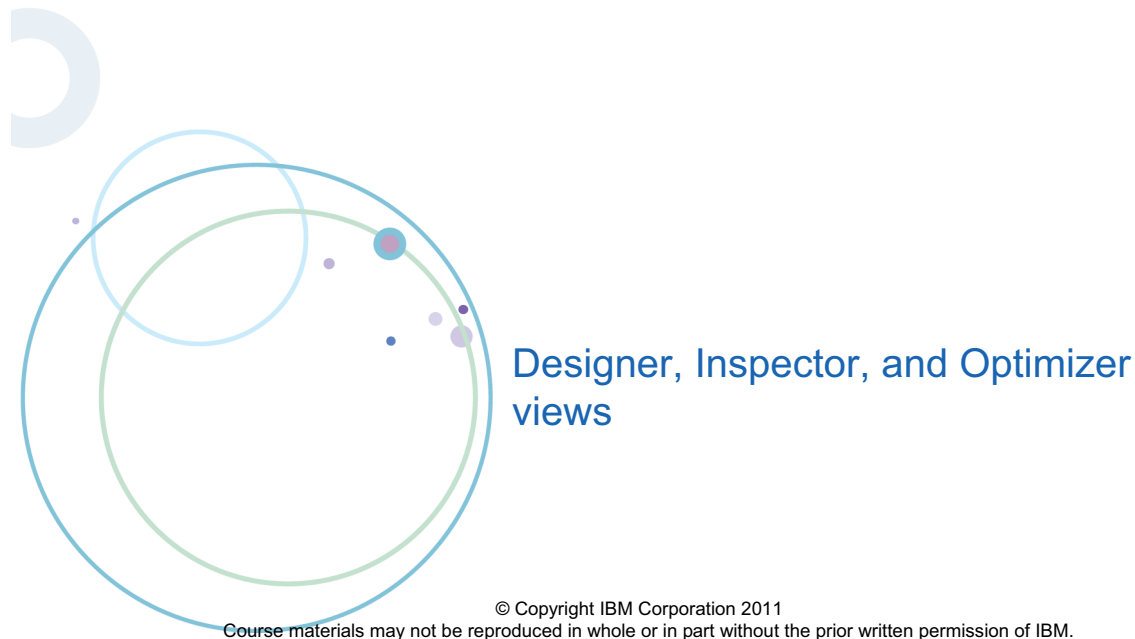




## **2.3. IBM Process Designer**

### **Instructor topic introduction**

## IBM Process Designer



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Figure 2-15. IBM Process Designer

WB754 / VB7541.0

### Notes:

Once the process application is created, it is time to access the Process Designer applications to begin authoring the process model. In the Process Center console process apps list, a process application can be selected and then the “Open in Designer” button is clicked to launch the authoring tool. This topic covers the three interfaces at a high level. More information about these interfaces is shared later in this unit.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## About IBM Process Designer

- Eclipse-based integrated modeling environment
  - Used for development in Express and Standard configurations
- Connects directly to IBM Process Center
  - Store process assets in centralized repository
  - Manage dependencies, versions, and other artifacts
  - Deploy to test, staging, or production servers
- Models business process assets
  - May be built from BlueWorks Live representations
  - Assets may be modeled in applications (“process apps”) or reusable “toolkits”
  - Offers designing, testing, and optimization tools

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Figure 2-16. About IBM Process Designer

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### **Notes:**

***Instructor notes:***

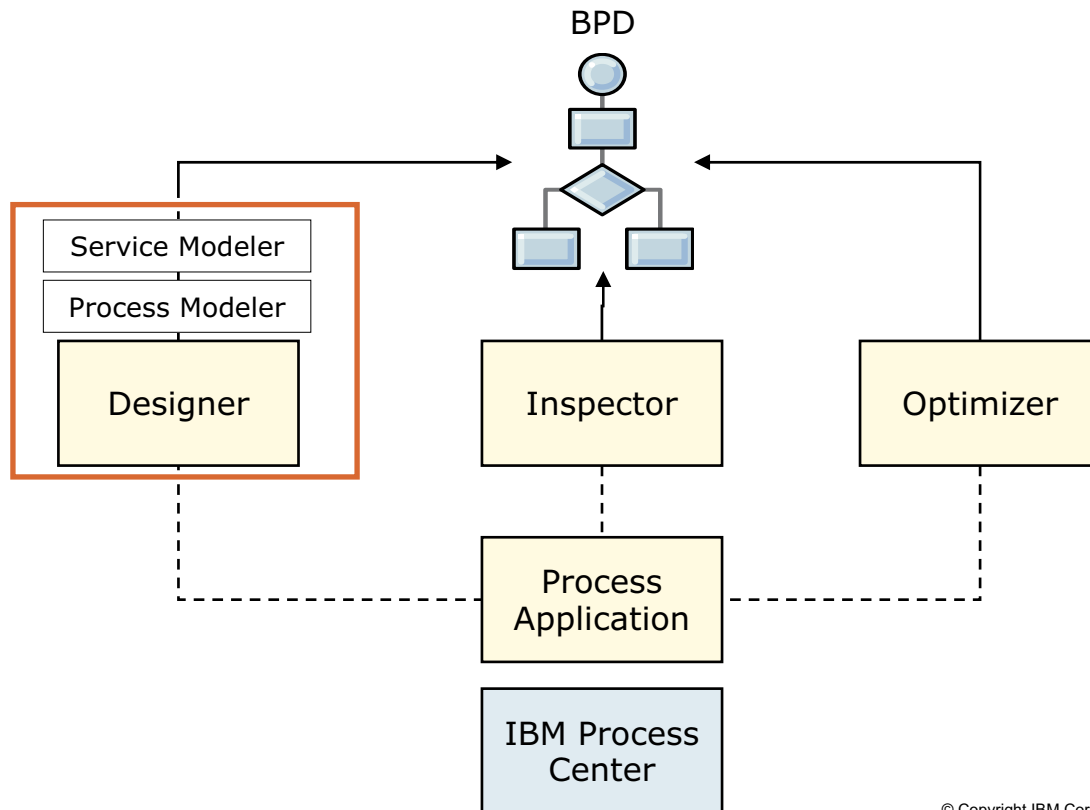
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Process Designer



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Figure 2-17. IBM Process Designer

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### Notes:

There are two main components that make up the Designer: The Process and Service Modeler. Each of these components provides unique features to accomplish the implementation of the process model. It is accomplished through the development of the human-centric process model using BPMN standards, or through the addition of services and integrations to specific business process activities.

***Instructor notes:***

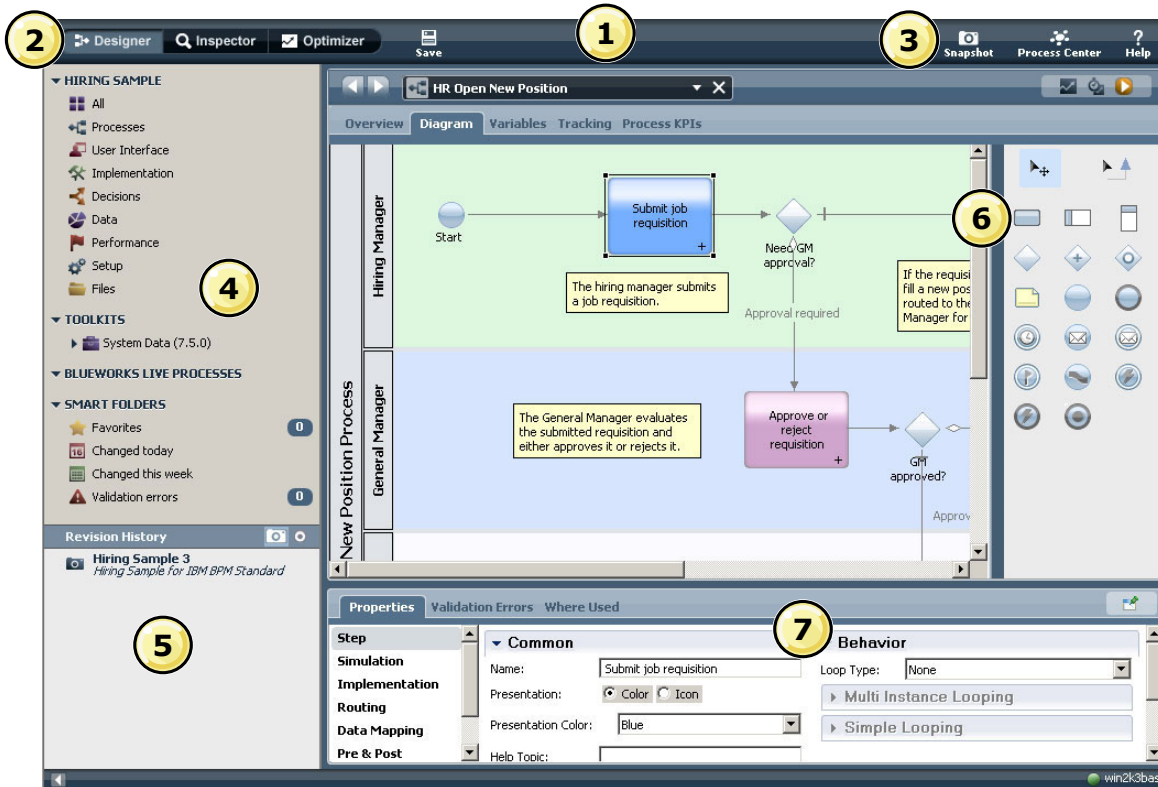
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Designer view – Process Modeler



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Figure 2-18. Designer view - Process Modeler

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### Notes:

- 1) The default view of the application once the process application in Designer is opened. This view represents the Designer with the Process Modeler component.
- 2) To switch to another interface, click the tab option at the upper left corner of the application. The choices are Designer, Inspector, and Optimizer.
- 3) To return to the Process Center console, click the “Process Center” icon at the upper right corner. There is also an option to access the Business Process Manager help system and to “snapshot” a version of the current state of the business process definition (or model).
- 4) The library for each process application is located in the far left side of the application. It is here an author would create and access to modify assets for the process application. The library includes system toolkits provided with Business Process Manager. Toolkits can be created by authors or a system toolkit can be used as is or modified to fit the application requirement. The toolkits created or modified here are then available for further administration in the Process Center for this process application. The library itself is organized in a category-based system for easy access and retrieval. In addition, an author



can choose to tag specific assets and use the smart folders system for project-specific ease of use by the project team.

5) At the lower left side of the application is a list of snapshots and revision history for the process application. Snapshots allow authors to view and access different project development stages or to protect important project lifecycle development milestones. Snapshots of the business process definition are available for administration in the Process Center once created here.

6) The upper right side of the application is reserved for the specific modeler component in use, in this case the Process Modeler. The process modeler consist of the business process model diagram view and its associated BPMN palette. The top area of the Process Modeler component is the menu of available options to help model and implement the BPD. Process applications can have more than one BPD and service asset associated with it. For that reason, a pull-down menu is provided at the top of the Process Modeler. To the right of that pull-down menu is the “run” button. Clicking this red circle with white arrow button allows authors to switch automatically from BPD implementation to the Inspector test mode.

7) At the bottom quadrant of the application is the properties and associated information area for specific BPD diagram components, such as swimlane, activity, and decision elements. By clicking once on a specific BPD diagram component, an author can add important implementation properties to the element, such as routing, data mapping, or custom JavaScript.

***Instructor notes:***

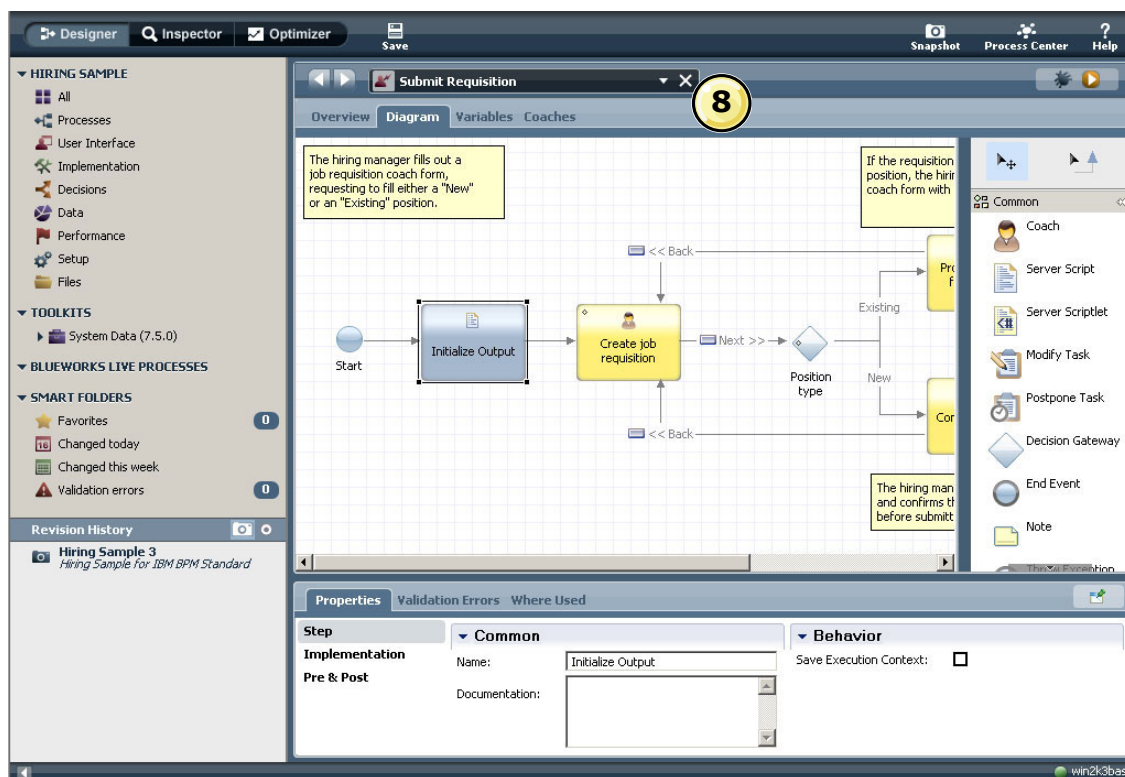
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Designer view – Service Modeler



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Figure 2-19. Designer view - Service Modeler

WB754 / VB7541.0

### Notes:

8) To switch from the Process Modeler to the Service Modeler, an author would use the pull-down menu located in the top corner of the modeler quadrant. The specific service must be created and associated with the process application to be accessible. If an author wants to create a specific service, then using the system toolkit provides a quick start on most types of services available, such as connector services for integration with a web service. System services can be modified to specific project needs by using the service element palette.

Once modified, the service can be stored as new toolkits for the process application. If a particular BPD activity element uses the service, it can be associated to that one activity. Authors can access the service in the Service Modeler automatically when double-clicking the activity in the Process Modeler view. A particular BPD activity has a service associated to it by a "+" sign at the lower right side of the element in the diagram. Notice that the Properties area at the bottom quadrant of the process application also changes to implementation property information associated with the specific service.

***Instructor notes:***

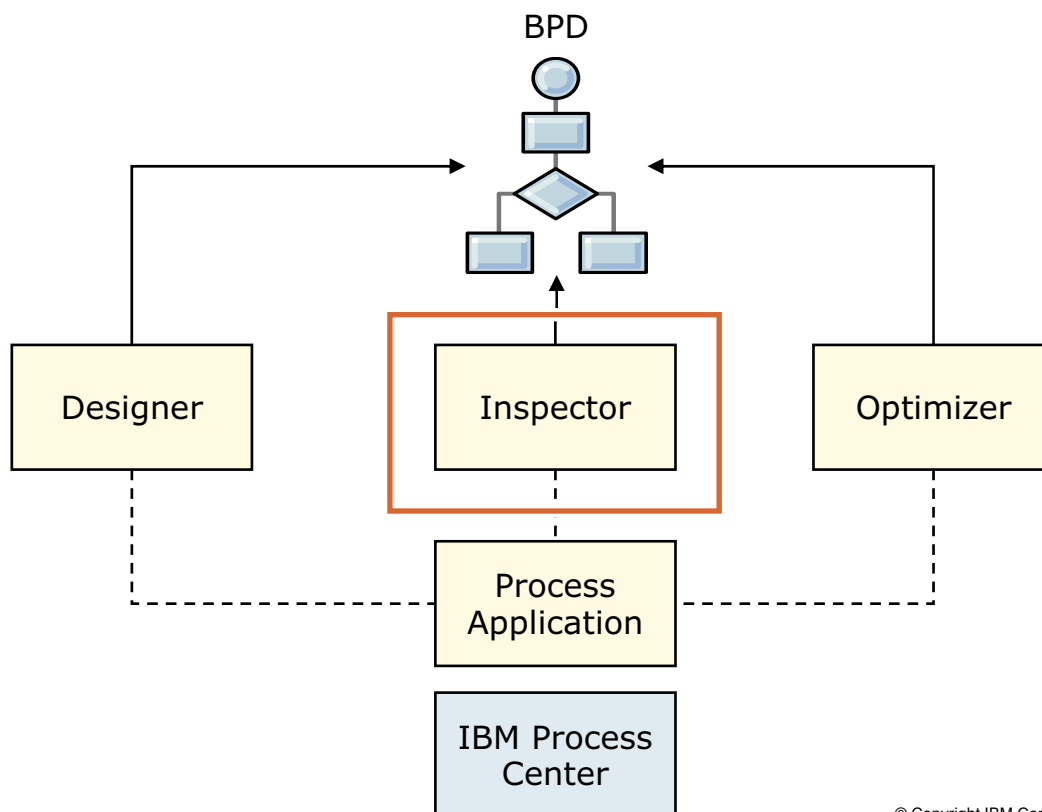
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Process Designer



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Figure 2-20. IBM Process Designer

WB754 / VB7541.0

### Notes:

The next interface for the Process Designer is the Inspector. Inspector allows authors to test and debug business process definitions as a runtime process application. This functionality is available because the Process Server provides authors the ability to deploy the application on runtime servers in order to test. Individual author debugging and peer-to-peer testing becomes easy to handle during the project development lifecycle because of the Inspector.

***Instructor notes:***

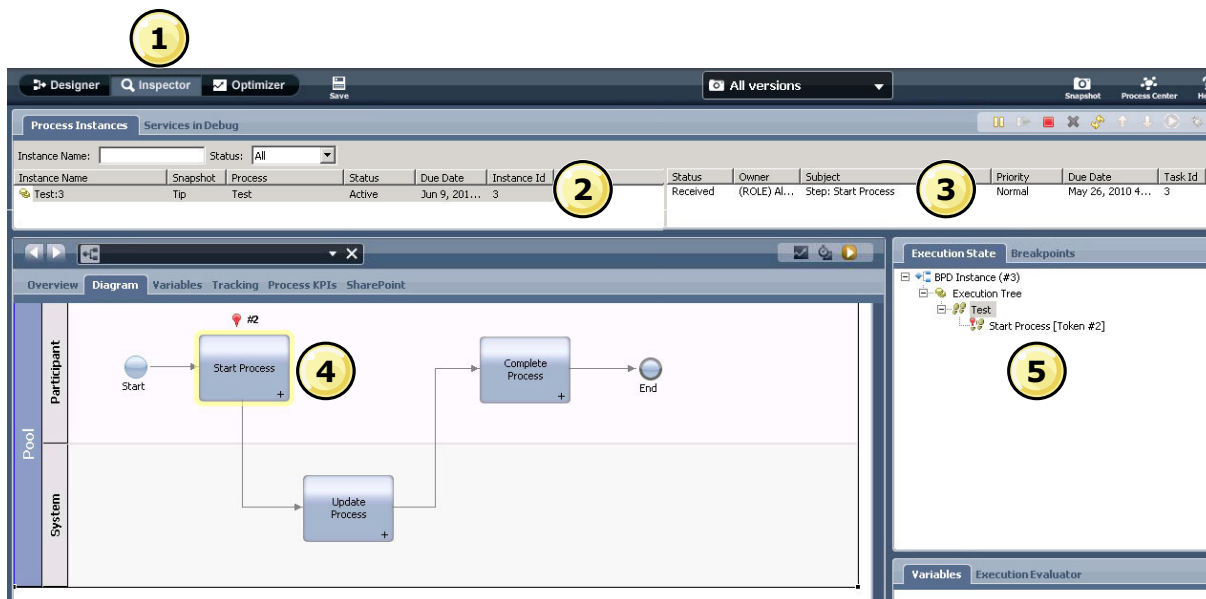
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Inspector



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Figure 2-21. Inspector

WB754 / VB7541.0

### Notes:

- 1) Process model authors can access the Inspector interface for a business process definition by clicking the upper left tab. Another way to access the interface is by clicking the red circle, white arrow “run” button at any time in the Designer view. Clicking the run button creates a runtime instance for the business process definition that is ready to test and debug.
- 2) The runtime instance appears in the upper left quadrant of the application. An author can test multiple instances of the same BPD if wanted. Multiple instances would allow authors to have one basic implementation of the BPD and a second instance with implementation modifications. Both would be viewed as runtime instances of the same BPD with different outcomes based on the changes made.
- 3) With a runtime instance available to test, authors can step through each BPD task and debug these individual activities in the process model. The toolbar at the upper left corner of the application provides different functions to manage either the process instance or the individual process tasks during testing. Of particular interest is the ability to run the process

tasks either in the full application view or in a debug mode for more comprehensive information to validate task implementation.

4) The Inspector also provides a diagram view of the runtime instance performance, highlighting runtime tokens moving from task to task. This view provides the process flow and where processes may get stuck or function as developed as opposed to function as wanted.

5) There is the execution progress information to provide comprehensive information of function as developed information for an author. This works with the variables used quadrant to see how specific data mapping was implemented.



***Instructor notes:***

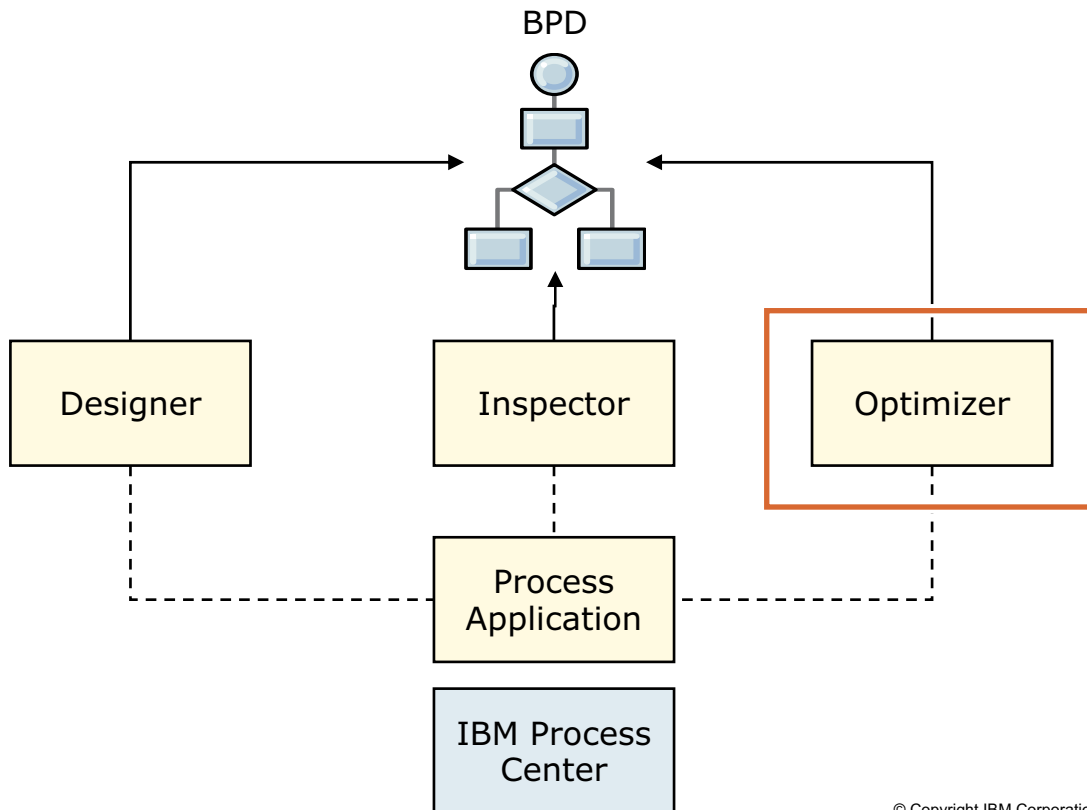
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Process Designer



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Figure 2-22. IBM Process Designer

WB754 / VB7541.0

### Notes:

Optimizer is the last of the three Process Designer interfaces. Optimizer is designed for use by BPM project team members interested in testing business process SLAs and KPIs before deployment through the use of simulation scenarios. Optimization usually falls in the responsibility of BPM analyst and process owners. Optimizer is also used to evaluate the process application and associated process models performance after deployment. The historical data is stored in the Performance Data Warehouse of the Process Server and made available in Optimizer to run through a series of analysis models, such as time-based performance.

***Instructor notes:***

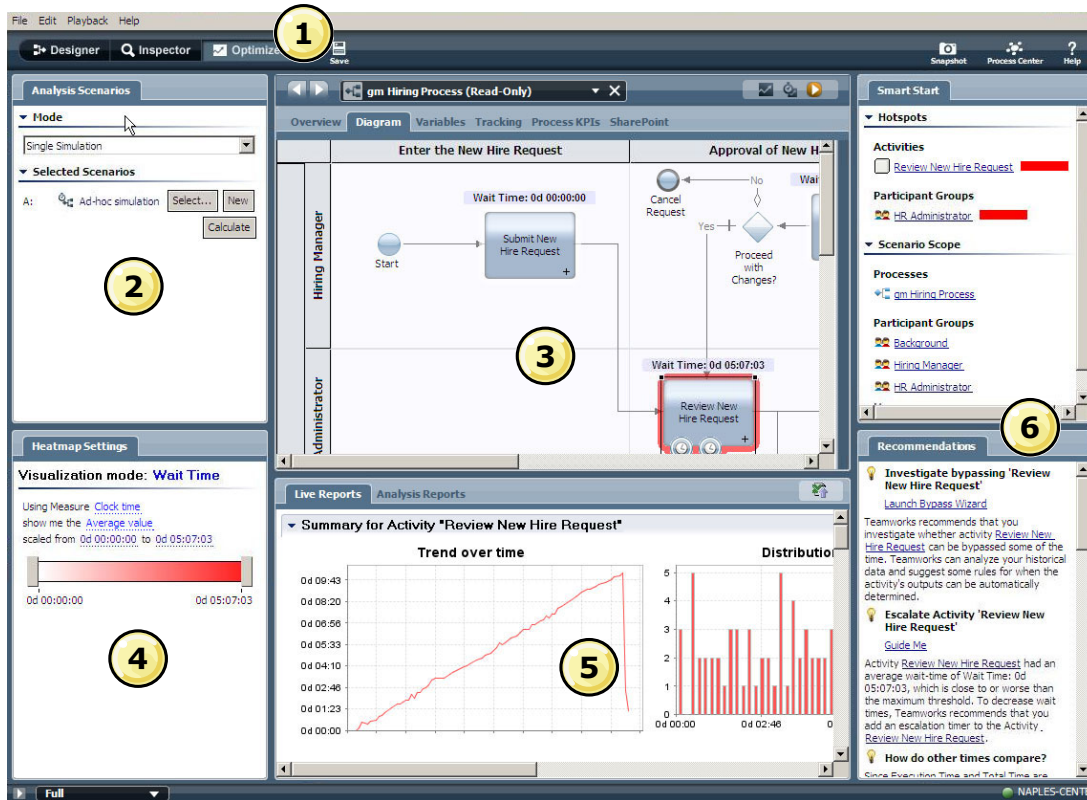
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Optimizer



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Figure 2-23. Optimizer

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### Notes:

1. The Optimizer interface for a business process definition can be accessed through the tab button on the top quadrant of the application.
2. In the Optimizer interface, an analyst, or anyone on the project team can select simulation scenarios for validation of process application performance against the established SLAs.
3. The diagram view in the Optimizer allows authors to view heat maps applied to the business process definition based on performance. Heat maps provide a quick view of tasks within compliance of SLAs.
4. Heat map settings can be adjusted for specific SLAs, such as “wait time” in order to evaluate what type of improvements help mitigate problem tasks.
5. The optimizer provides reports to view. These reports are categorized as Live Reports for runtime instances and Analysis Reports for more evaluation purposes.

6. Optimizer provides a smart start for the optimization effort as well as provide recommendations to try in terms of improvements and adjustments for the business process definition.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## **2.4. The Process Portal**

### **Instructor topic introduction**

## The Process Portal



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Figure 2-24. The Process Portal

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### Notes:

The Process Portal is a part of the IBM Business Process Manager toolset. It is a browser-based interface that allows for start and stopping a process, manage and run tasks for each process, and view performance of individuals, teams, and processes. This topic covers the basics of the Process Portal. More on the Process Portal use is covered in the discussions on playbacks later in the course.



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## About the Process Portal

- Web-based interface for working with processes
  - Start and stop a process application
  - Manage and run tasks for a process
  - View performance of individuals, teams, and processes
  - Similar to BPEL Process Choreographer Explorer with IBM Process Server
- Offers a simple, secure method for managing processes
- Installed with IBM Process Center

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Figure 2-25. About the Process Portal

WB754 / VB7541.0

### Notes:

The Process Portal is a part of the IBM Business Process Manager toolset. It is a browser-based interface that allows for start and stopping a process, manage and run tasks for each process, and view performance of individuals, teams, and processes. This topic covers the basics of the Process Portal. More on the Process Portal use is covered in the discussions on playbacks later in the course. The Process Portal is a web-based tool for working with processes, much like the BPEL Process Choreographer Explorer is used for IBM Process Server. However, you must remember that IBM Process Server, and therefore, the BPEL Process Choreographer Explorer, are only available with the Advanced configuration of IBM Business Process Manager. As well, the Process Portal is limited to processes, whereas the BPEL Process Choreographer Explorer may be used with BPELs, human tasks. Finally, the pieces of the BPEL Process Choreographer Explorer are built using reusable JavaServer Faces and as such, can be used compose a custom environment. It is not possible with the Process Portal.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Process Portal

IBM | Process Portal

Welcome, Internal TW Admin user | Help | Preferences | Log Off

**My Tasks**

- Inbox
- History
- Help Requests
- Alerts

**My ScoreBoards**

- My Performance
- My Performance (7.5.0)
- My Team Performance
- My Team Performance (7.5.0)
- Process Performance
- Process Performance (7.5.0)
- SLA Overview
- SLA Overview (7.5.0)
- Ad Hoc Reports

**Inbox**

New | [Icons] | Quick Search

Search | Organize by Task | Show Search

Instance Name	Process Definition	Instance Due Date	Task Subject	Task Priority	Task Due Date	Run
Validate Salary:3	Hiring Position	Jul 22, 2011 8:41:07 AM	Step: Negotiate Salary	Normal	Jul 21, 2011 9:43:56 AM	[Run]
Validate Salary:4	Hiring Position	Jul 22, 2011 8:46:27 AM	Step: Negotiate Salary	Normal	Jul 21, 2011 9:47:07 AM	[Run]
AccountVerification:5	AccountVerification	Aug 5, 2011 11:09:59 AM	Step: Determine Application Eligibility	Normal	Jul 22, 2011 12:10:02 PM	[Run]
AccountVerification:6	AccountVerification	Aug 5, 2011 11:10:04 AM	Step: Determine Application Eligibility	Normal	Jul 22, 2011 12:10:04 PM	[Run]
AccountVerification:8	AccountVerification	Aug 5, 2011 11:10:43 AM	Step: Determine Application Eligibility	Normal	Jul 22, 2011 12:10:43 PM	[Run]

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Figure 2-26. Process Portal

WB754 / VB7541.0

### Notes:

1) Process participants use these links to navigate to tasks, scoreboards, and projects:

- My Tasks: Receive and complete tasks that are assigned to you. From your Inbox, process participants can also view task execution history, requests for help from other process participants, and process-related alerts.
- My Scoreboards: Monitor individual and team process performance, view custom reports, and create reports

2) This area displays the name of the current Process Portal user. Process participants click “Preferences” to specify their email and language settings. Help is clicked to open the online user assistance for Process Portal.

3) Process participants use the toolbar icons to manage process instances and tasks. For example, a process participant can start, suspend, resume, or terminate active process instances. The participant can also assign tasks to users or groups, change the due date of a process instance or a task, and search for process instances and tasks.

4) The main area that displays the items process participants are currently working with. The image shows the tasks in the current users Inbox. The tasks are displayed according to the process instance that generated each task. Users can click an Instance Name or Task Subject to see more detailed information about each task. In this area, users can also view and sort search results, view reports and scoreboards, and edit preferences.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Unit summary

Having completed this unit, you should be able to:

- Describe how IBM Business Process Manager is used to accomplish process modeling goals
- Explain how to create and modify process applications in IBM Process Center
- Explain how to create and modify process models using the Designer view of IBM Process Designer
- Describe how to validate process models using the Inspector view of IBM Process Designer
- Describe the purpose of the Process Portal

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Figure 2-27. Unit summary

WB754 / VB7541.0

### Notes:

Having completed this unit, you should be able to:

- Describe how IBM Business Process Manager is used to accomplish process modeling goals
- Explain how to create and modify process applications in the Process Center
- Explain how to create and modify process models using the Designer view of the Process Designer
- Describe how to validate process models using the Inspector view of the Process Designer
- Describe the purpose of the Process Portal

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## Checkpoint questions

Your instructor reviews these questions with you as a group. The instructor may provide you time to answer the questions on your own before the group discussion. Place your answers in the space provided.

1. True or false: The three key views of IBM Process Designer are the Modeler, Inspector, and Optimizer.
2. Which of the following is not true about IBM Process Center?
  - a) Includes a server and repository
  - b) Includes tools for building process applications
  - c) Includes tools for running process applications
  - d) Stores process performance data for testing
3. True or false: Process Portal is a browser-based interface that allows for starting and stopping a process, managing and running tasks, and viewing performance of individuals and processes.

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Figure 2-28. Checkpoint questions

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### Notes:

Write your answers here:

1.

2.

3.

Suggested answers are included on the next page.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Checkpoint answers

1. **False:** The three key views are Designer, Inspector, and Optimizer.
2. **(b)** The Process Center includes a Process Center Server and a Performance Data Warehouse, allowing you to run process applications and also store process performance data for testing and playback purposes during development efforts. So, Process Center Server and Performance Data Warehouse are the main contributors in end-to-end governance. Process applications are modeled with IBM Process Designer.
3. **True.**

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Figure 2-29. Checkpoint answers

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Exercise

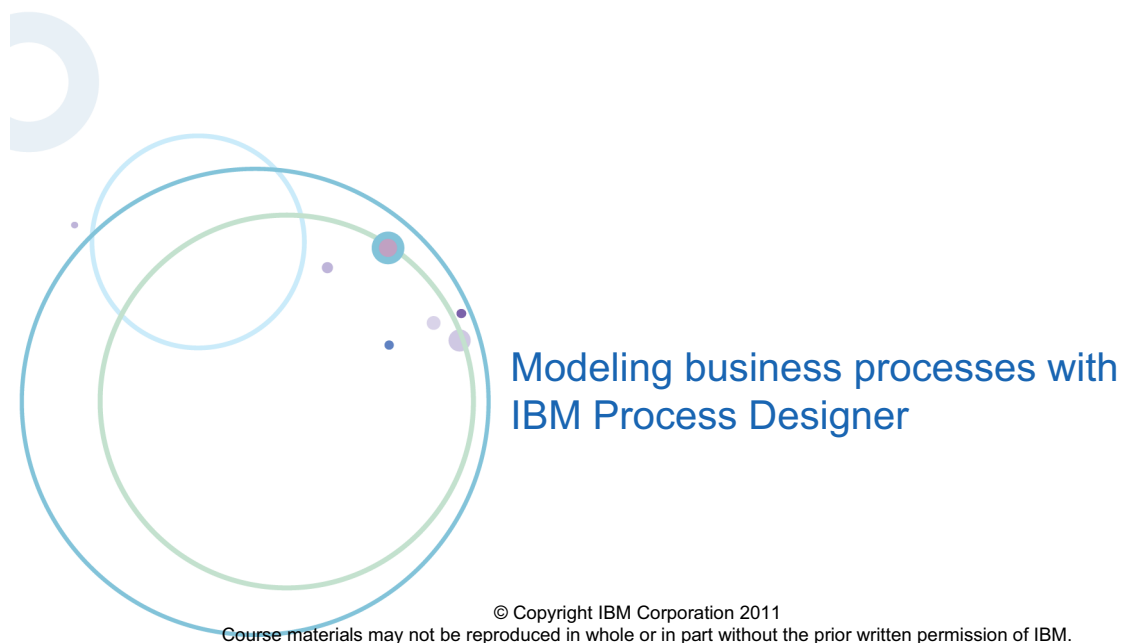


Figure 2-30. Exercise

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Exercise objectives

After completing this exercise, you should be able to:

- Open a business process activity in IBM Process Designer
- Explore a business process in IBM Process Designer
- Use the Playback feature to examine a running business process in IBM Process Designer Inspector
- Use a coach to work with a running business process
- Wire activities together in a business process

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Figure 2-31. Exercise objectives

WB754 / VB7541.0

### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## References

- IBM WebSphere Business Process Management information center:
  - <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/index.jsp>
- BPM - Business Process Management
  - <http://www.ibm.com/software/info/bpm/>
- IBM Business Process Manager home page:
  - <http://www.ibm.com/software/integration/business-process-manager/>
- IBM Business Process Manager on developerWorks:
  - <http://www.ibm.com/developerworks/websphere/zones/bpm/>

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Figure 2-32. References

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Unit 3. IBM Process Center

### Estimated time

00:45

### What this unit is about

In this unit, you learn how to deploy, test, and manage applications using IBM Process Center.

### What you should be able to do

After completing this unit, you should be able to:

- Describe the purpose and business value of IBM Process Center
- Define the various components of IBM Process Center
- Describe how to use IBM Process Center Console to deploy, test, and manage BPM applications

### How you will check your progress

- Checkpoint
- Machine exercise

## Unit objectives

After completing this unit, you should be able to:

- Describe the purpose and business value of IBM Process Center
- Define the various components of IBM Process Center
- Describe how to use IBM Process Center Console to deploy, test, and manage BPM applications

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Figure 3-1. Unit objectives

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Topics

## Topics

This unit is divided into the following topics:

- Introduction to IBM Process Center
- Components of IBM Process Center
- Test and deploy BPM applications

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Figure 3-2. Topics

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: IBM Business Process Manager V7.5





## **3.1. Introduction to IBM Process Center**

### **Instructor topic introduction**

## Introduction to IBM Process Center



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Figure 3-3. Introduction to IBM Process Center

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### **Notes:**

***Instructor notes:***

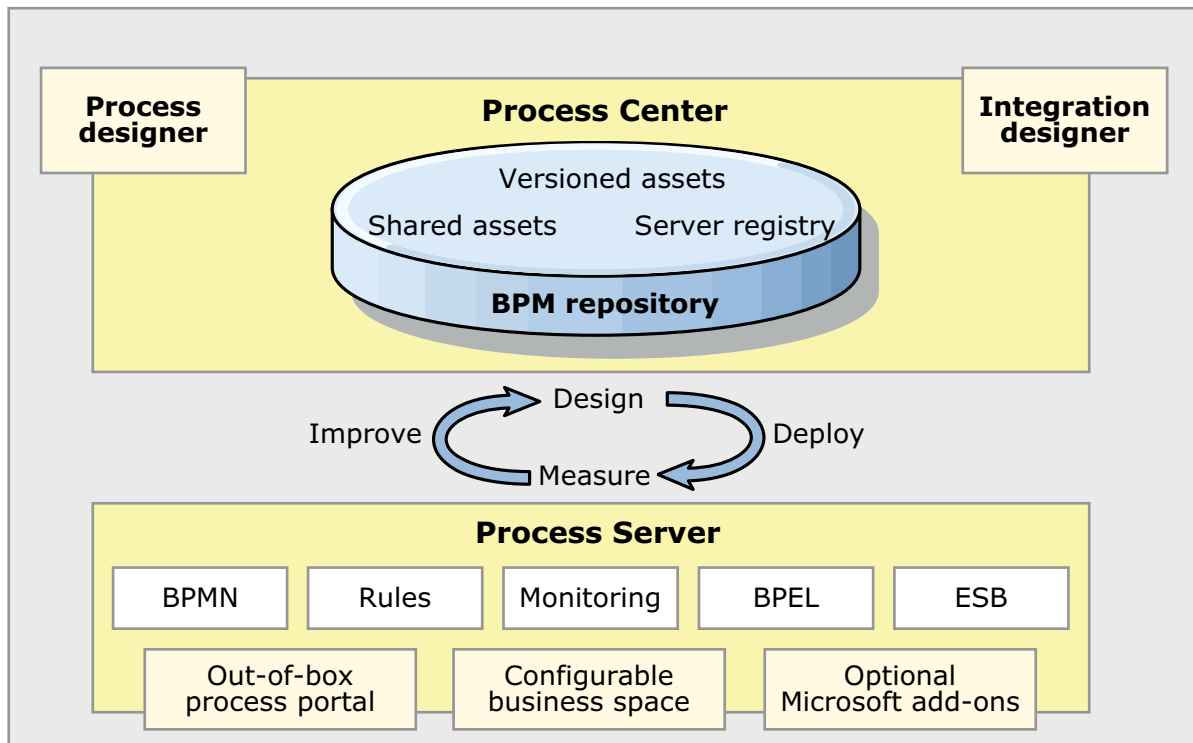
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Business Process Manager V7.5



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Figure 3-4. IBM Business Process Manager V7.5

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### Notes:

IBM Business Process Manager V7.5 uses a concept that is called the shared model. In simple terms, this means that no matter what is being done within the overall solution, there is only one common repository and a single representation of that solution. Therefore, it is impossible to get two phases of the same solution out of sync with each other.

This shared model is realized by the BPM component called the IBM Process Center. IBM Process Center is a key component within IBM Business Process Manager V7.5. Part of the IBM process center is a data repository which is simply called the repository. Within the repository, there exists the representation of the solution. The BPM tooling connects as a client to the IBPM Process Center to obtain copies of the solution for working upon. When a user changes an artifact and saves those changes, the results are written back to the repository.

The IBM Process Center repository is implemented as tables within a database (commonly DB2).

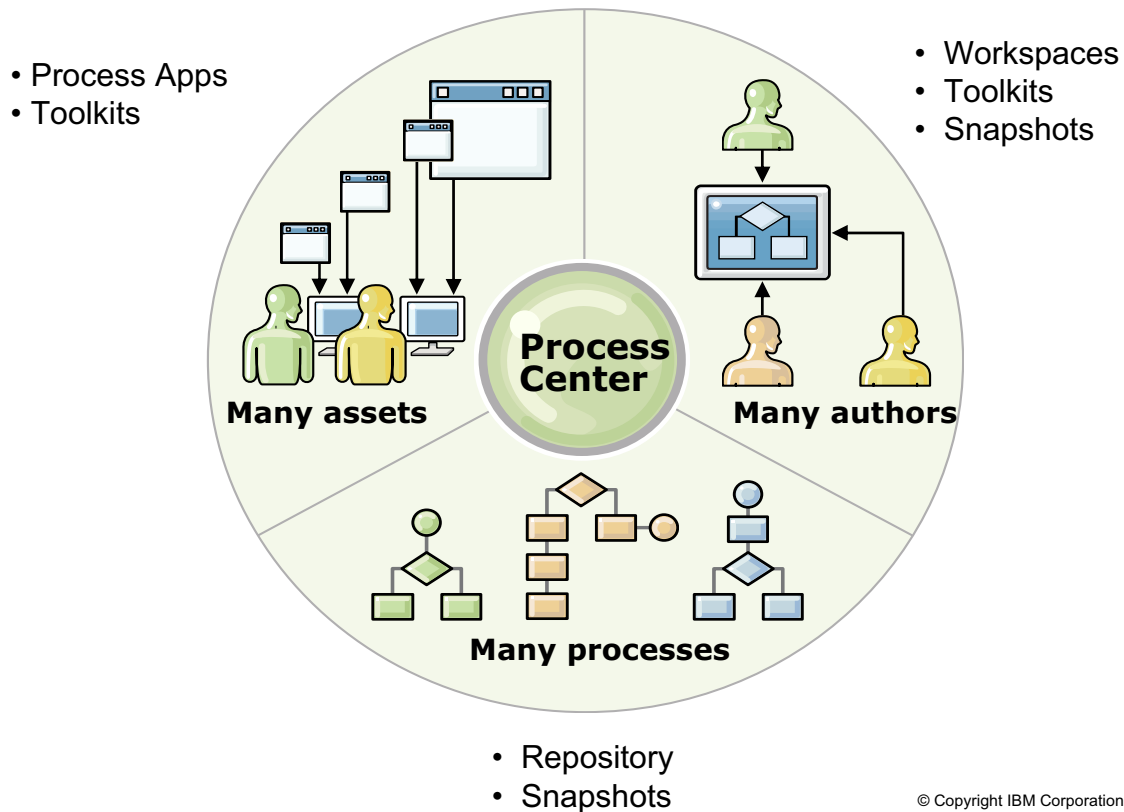
**Instructor notes:****Purpose —**

**Details —** All parties involved in the effort to define, model, implement, measure, and improve the process are working from a common shared platform that encapsulates all of the various components. The analyst modeling the process, the developers constructing the detailed implementation of it, the participants executing the process, and the process owner and analysts who monitor and identify improvements are all using the same tool. This tool uses the same definition of the process. The model of the process built by the analysts and developers is the same one that executes at run time. It is the same one used to create reports on the current performance and status of the process, and is the same one used to model and simulate potential improvements.

**Additional information —**

**Transition statement —** Next: IBM Process Center capabilities

## Process Center: end to end governance



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Figure 3-5. Process Center: end to end governance

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### Notes:

The Process Center provides project development teams a shared development platform and an end-to-end governance of process applications to mitigate typical application development problems. The Process Center allows for the management of the different process applications created for specific projects along with the assets for each. The Process Center includes a Process Center Server and a Performance Data Warehouse, allowing you to build and run process applications and also store process performance data for testing and playback purposes during development efforts.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Process Center capabilities

- Repository for all BPM assets
  - Process applications, reusable toolkits, monitor models, and many more
- Life cycle management and deployment of all applications
  - Manage dependencies, versions, deployment to servers
- Includes execution environment for development and testing
- Equally accessible from IBM Process Designer and from IBM Integration Designer
- Central governance
- Web interface using IBM Process Center console

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Figure 3-6. IBM Process Center capabilities

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### **Notes:**

You can use the IBM Process Center repository to share artifacts with other users who are developing process applications and toolkits.



***Instructor notes:***

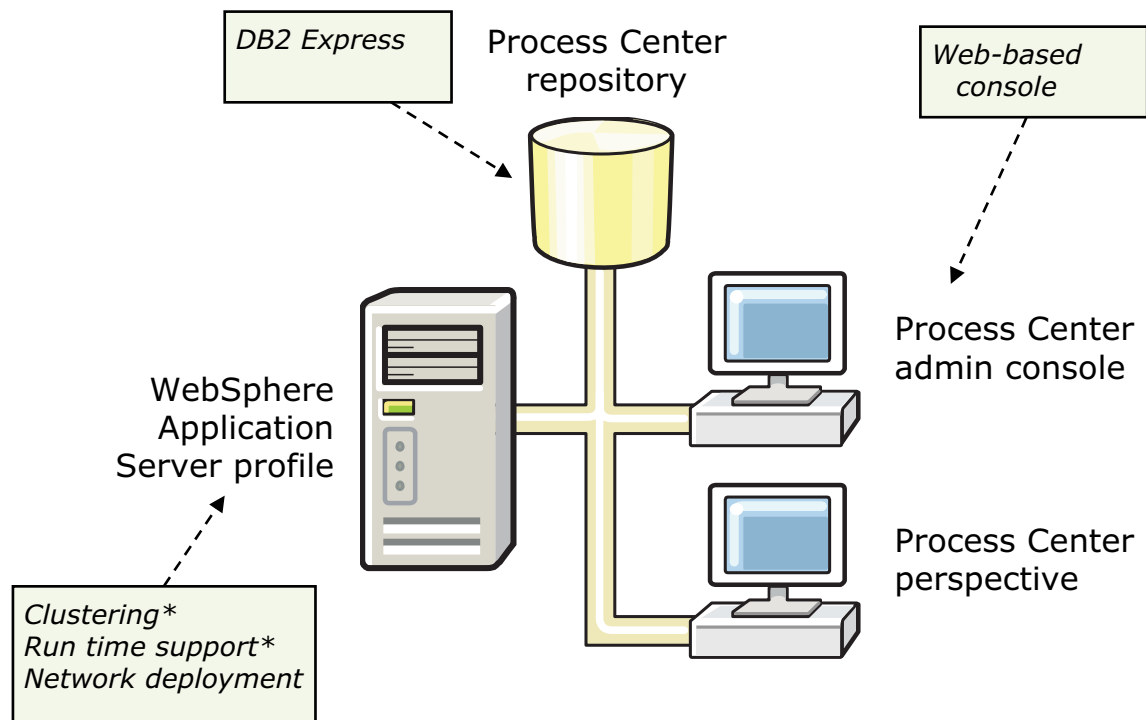
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Topics

## About IBM Process Center



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Figure 3-7. About IBM Process Center

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### Notes:

IBM Process Center is a centralized tool which uses WebSphere Application Server and a database as a repository. IBM Process Designer and IBM Integration Designer offer perspectives to work with assets stored in the Process Center repository. The pieces of IBM Process Center include:

#### Application server

- A WebSphere Application Server profile which offers all the expected functionality of WebSphere Application Server network deployment, including clustering, and a run time engine. In the Express configuration of IBM Business Process Manager, clustering is not supported. IBM Process Center is used as the run time engine for the Express and Standard configurations, but not for the Advanced configuration. In the Advanced configuration, IBM Process Server is the run time engine.

#### Database

- IBM Process Center uses a repository which, by default, is based upon DB2 Express. The repository may be installed on other databases at installation time.

**Administration console**

- IBM Process Center offers a web-based administration console which may be launched from a browser. This same interface is also offered in development tool perspectives (IBM Process Designer and IBM Integration Designer)

***Instructor notes:***

**Purpose —**

**Details —**

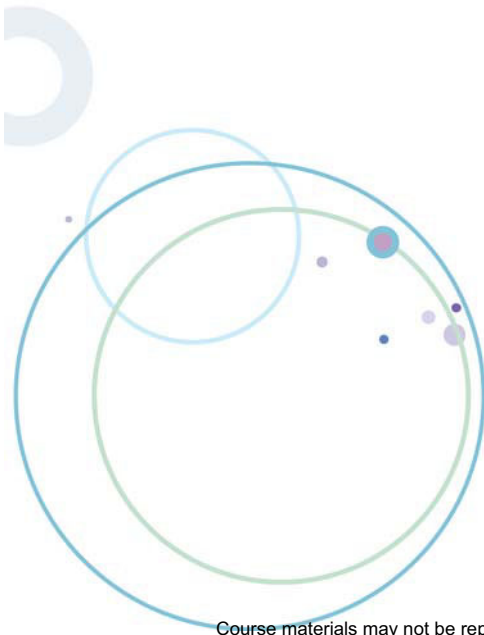
**Additional information —**

**Transition statement —**

## **3.2. Components of IBM Process Center**

### **Instructor topic introduction**

## Components of IBM Process Center



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Figure 3-8. Components of IBM Process Center

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### Notes:

***Instructor notes:***

**Purpose —**

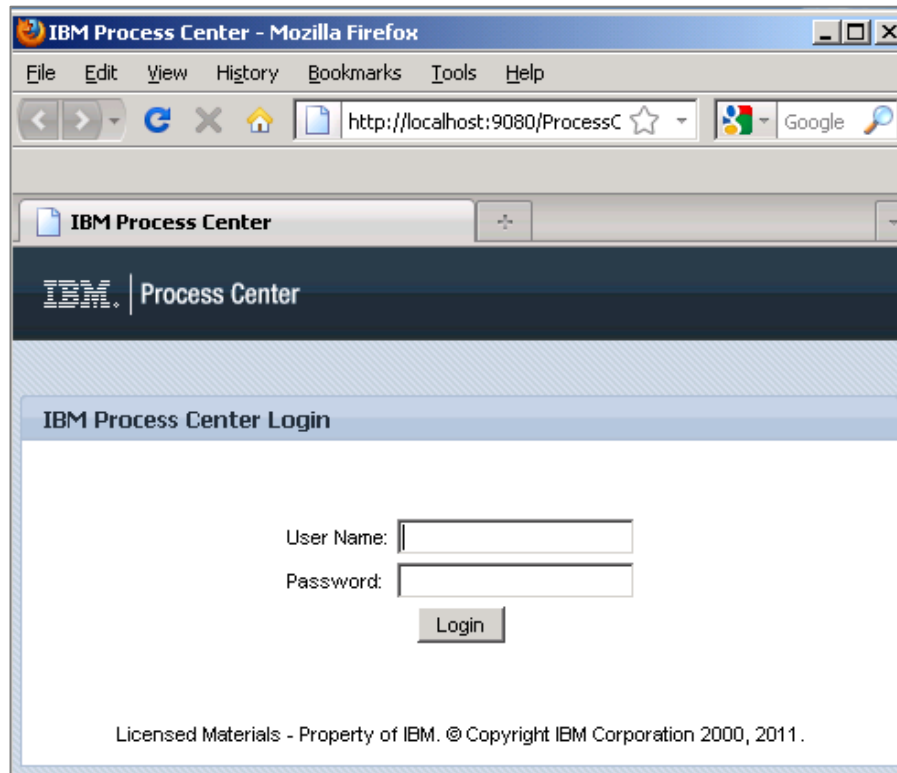
**Details —**

**Additional information —**

**Transition statement —** Next: IBM Process Center Console

## IBM Process Center Console

- The IBM Process Center Console provides a web-based interface for managing the Process Center maintained projects
- It provides the tools needed to maintain the repository



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Figure 3-9. IBM Process Center Console

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### Notes:

The Process Center Console provides a web-based interface for managing the Process Center maintained projects. The default URL for IBM Process Center Console is <http://localhost:9080/ProcessCenter>.

The IBM Process Center includes a repository for all processes, services, and other assets. The IBM Process Center Console provides the tools that you need to maintain the repository.

From the Process Center console:

- You can create process applications and toolkits and grant other users access to those process applications and toolkits.
- Administrators install process applications that are ready for testing or production on the IBM Process Servers in those environments.
- Administrators manage running instances of process applications in configured environments.



***Instructor notes:***

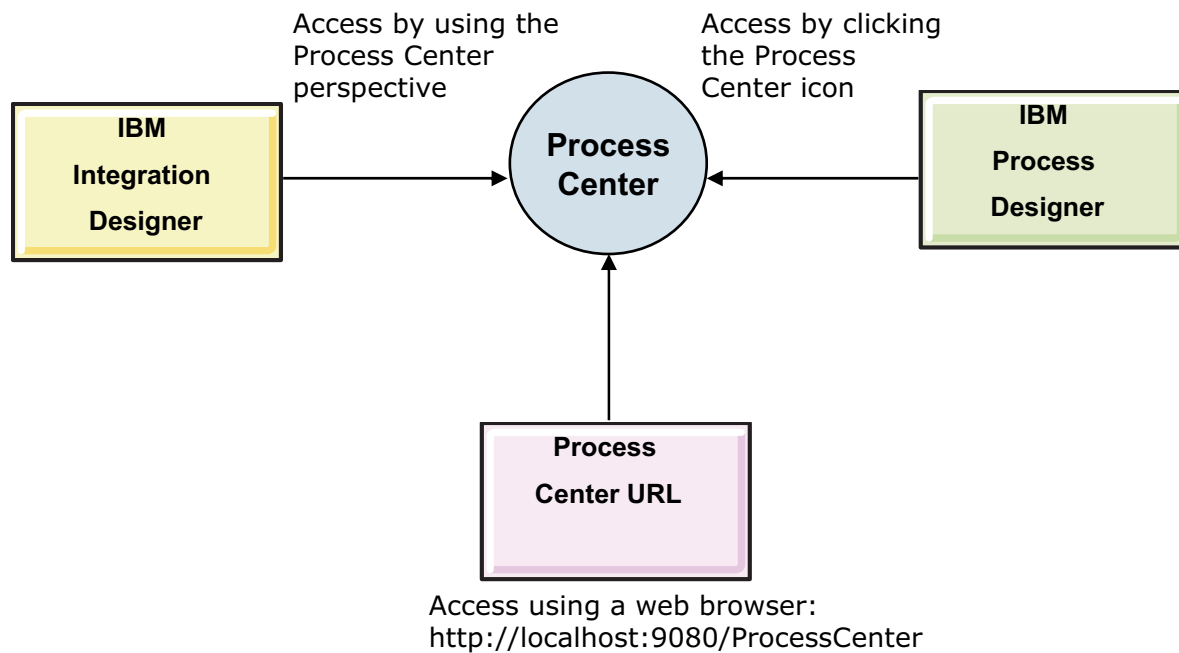
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Accessing IBM Process Center

## Accessing IBM Process Center



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Figure 3-10. Accessing IBM Process Center

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### Notes:

IBM Process Center can be accessed in several ways:

1. Switching to the Process Center perspective in the IBM Integration Designer
2. Clicking the IBM Process Center icon at the upper right in the IBM Process Designer
3. Using a web browser at the default URL: <http://localhost:9080/ProcessCenter>

The Process Center view and capability may slightly vary depending which tool you are using. The tooling dictates the capability depending on its functionality.

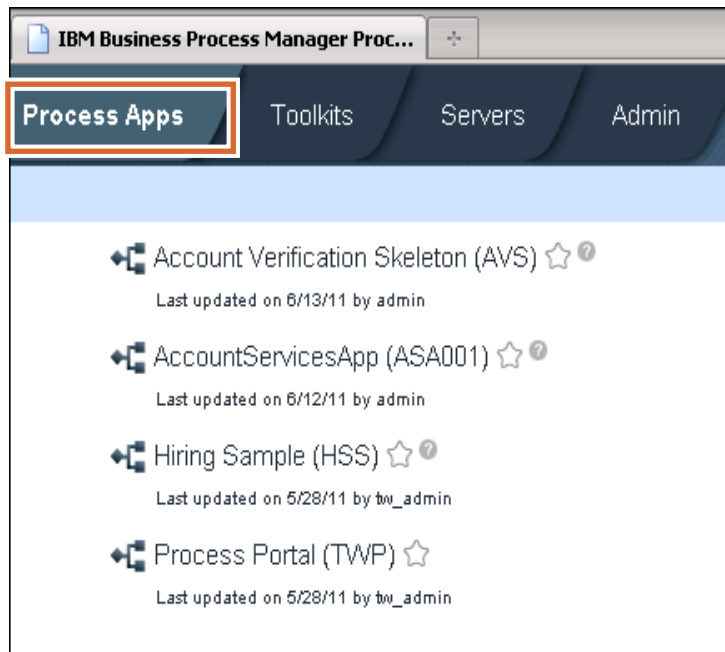
***Instructor notes:*****Purpose —****Details —**

**Additional information —** Inform the students that they have an opportunity to work with all the three access ways when working in the lab that follows this unit.

**Transition statement —** The next slide is IBM Process Center: Process Apps

## IBM Process Center: Process Apps

- A Process Application is the container for a solution
- Initially created through the Process Center console
- It is given a name and a tag called an *acronym*
- The Process Application and its artifact contents are stored within a repository hosted and managed by the IBM Process Center



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Figure 3-11. IBM Process Center: Process Apps

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### Notes:

A process application is the container for a solution. You can loosely think of it as a project. The process application is initially created through the Process Center console. It is given a name and a tag called an *acronym*. The acronym must be unique and can be no more than seven characters in length. Once the process application container has been created, artifacts can then be further created within it using the IBM Process Designer.

The process application and its artifact contents are stored within a repository hosted and managed by the IBM Process Center. The main **Process Apps** page has a button to create a process application.

***Instructor notes:***

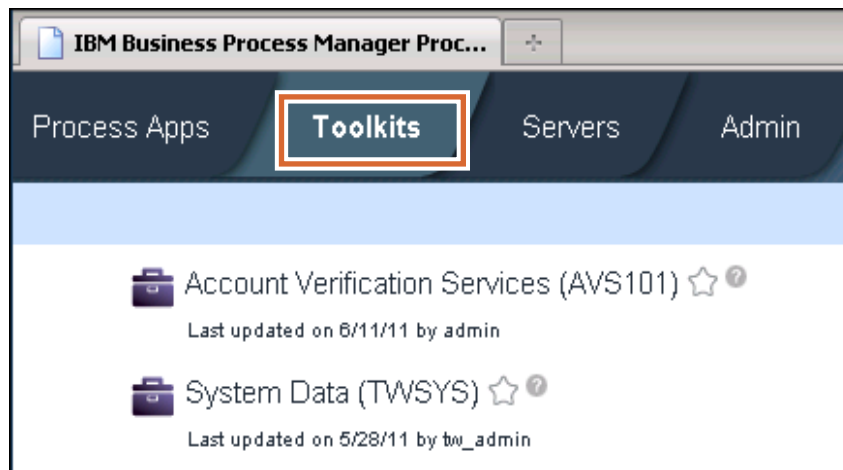
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## IBM Process Center: Toolkits



- Container for artifacts used in solutions
  - Does not result in a deployable application
- Can be “included” or “used” by one or more Process Applications
  - Similar to library with artifacts
- Can be added as a dependency to a Process Application

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Figure 3-12. IBM Process Center: Toolkits

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### Notes:

Similar to process applications, a toolkit can also be thought of as a container for artifacts used in solutions. Unlike a process application, a toolkit does not result in a deployable application. Instead, the contents of the toolkit can be “included” or “used” by one or more process applications.

When Process Center is installed and configured, an IBPM supplied toolkit called “System Data” is automatically imported into the repository. This toolkit is marked as read-only and implicitly a dependent on all other process applications and toolkits. It is the System Data toolkit that contains the core definitions for data structures and other items common across all process applications.

Toolkits have their own tabs in the Process Center consoles. From that point, new toolkits can be created, toolkits exported, and otherwise managed in a similar fashion to the ones of the process applications.

***Instructor notes:***

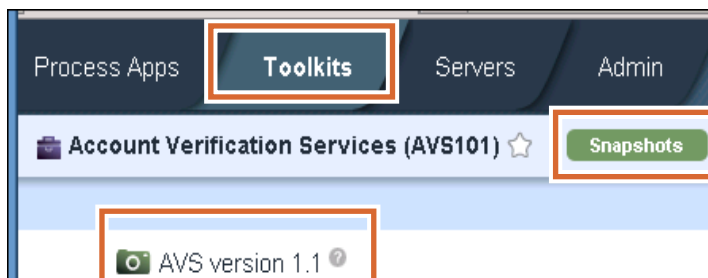
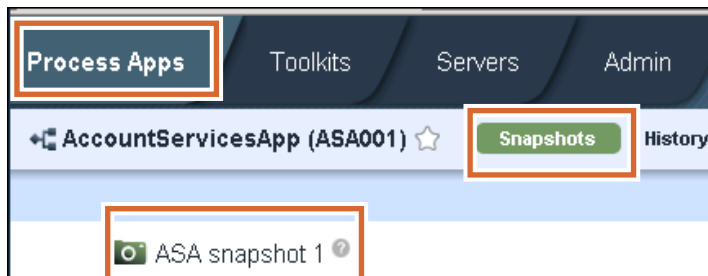
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** The next slide is IBM Process Center: Snapshots

## IBM Process Center: Snapshots



- A snapshot is a copy of the state of all the artifacts in a Process Application or Toolkit at the point in time when the snapshot was made
- Allows to revert in time to the state of the snapshot
- Allows for versioning of toolkits and process applications

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Figure 3-13. IBM Process Center: Snapshots

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### Notes:

A snapshot is a copy of the state of all the artifacts in a process application or toolkit at the point in time when the snapshot was made. The purpose of taking a snapshot is to allow you to revert in time to the state of the snapshot if that is wanted. A snapshot can be captured by clicking the Snapshot icon in IBM Process Designer.

A snapshot is required in some circumstances such as:

- A snapshot of a toolkit is required before it can be added as a dependency on other toolkits or process applications.
- A snapshot of a process application is required before that application can be installed on IBM Process Server.
- A snapshot is required before a new “workspace” can be created.

Just like process applications, toolkits can have snapshots taken of them allowing all the artifacts in a toolkit to be version controlled.



To add a toolkit as a dependency to a process application, the toolkit must first have a snapshot associated with it. This requirement is because the dependency added to the process application is **not** just the name of the toolkit, but is instead a specific snapshot of that toolkit.

***Instructor notes:***

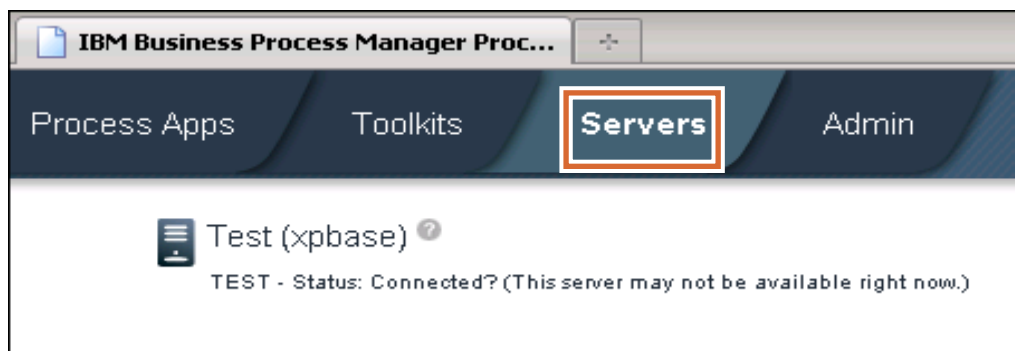
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** The next slide is IBM Process Center: Servers

## IBM Process Center: Servers



- The Servers tab lists the IBM Process Servers that are connected to the IBM Process Center
  - IBM Process Server connected could be a stand-alone server
  - IBM Process Server connected could be a server running inside the IBM Integration Designer test environment
  - Multiple servers can be connected
  - Multiple environments can be connected — development, testing, staging, and production

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Figure 3-14. IBM Process Center: Servers

WB754 / VB7541.0

### Notes:

The servers shown are the IBM Process Servers that are connected to the IBM Process Center. Authorized users can install snapshots of process applications on connected IBM Process Servers. For each server, you can view the snapshots that are currently installed

## ***Instructor notes:***

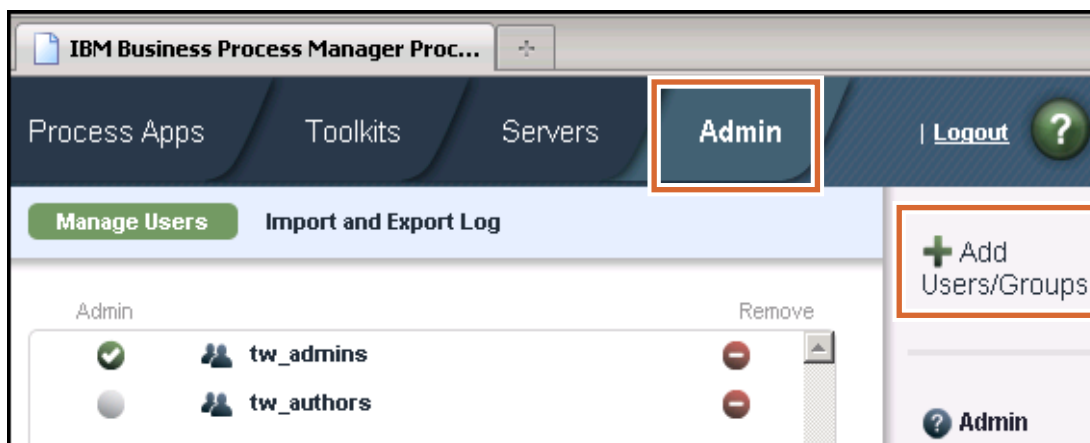
### **Purpose —**

**Details —** Inform the students that the lab image that they work on is connected to an IBM Process Center. This image is the IBM Process Server that is running in the IBM Integration Designer test environment, which they have used in the previous labs.

### **Additional information —**

**Transition statement —** The next slide is IBM Process Center: Admin

## IBM Process Center: Admin



- Add new users and groups to the list of authorized users
  - Granting users authority to access the Repository allows them to log in
- Process Apps and Toolkits are individually controlled with their own access control

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Figure 3-15. IBM Process Center: Admin

WB754 / VB7541.0

### Notes:

Granting users authority to access the repository allows them to log in to the IBM Process Center console. However, this access does not give privileges to work on or even see all the process applications in the environment. Process applications and toolkits are individually controlled with their own access control lists. From within the Process Apps section of the IBM Process Designer or the IBM Process Center console, an application can be selected and the **Manage** tab pressed. In that tab, there is a section into which users and groups may be associated. These groups define the permissions for those entities.

There are three roles a user or group can have:

- Read — This role allows a user or group to see the project and see the artifacts within it. The read role cannot be removed without removing the user or group association completely. If a user or group is **not** associated with a process application, then the user or group has no authorities on that application. If an artifact is opened and the user only has read authority, the artifact is flagged as read-only in the editor.

- Write — This role allows the user or group to update or add artifacts into the process application.
- Admin — This role allows the user or group to administer the process application.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Topic

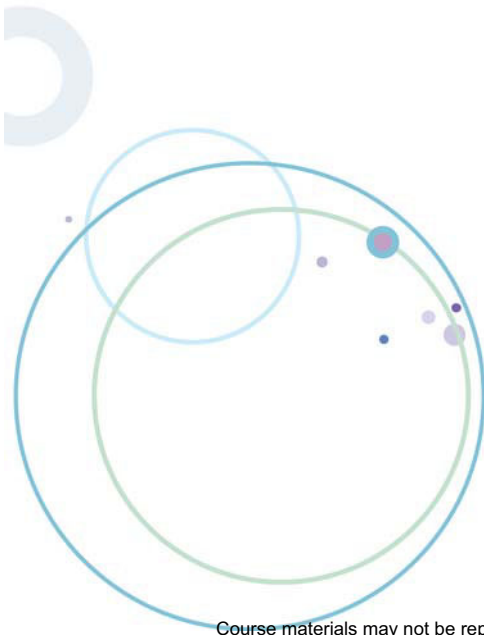




## **3.3. Test and deploy BPM applications**

### **Instructor topic introduction**

## Test and deploy BPM applications



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Figure 3-16. Test and deploy BPM applications

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### Notes:

***Instructor notes:***

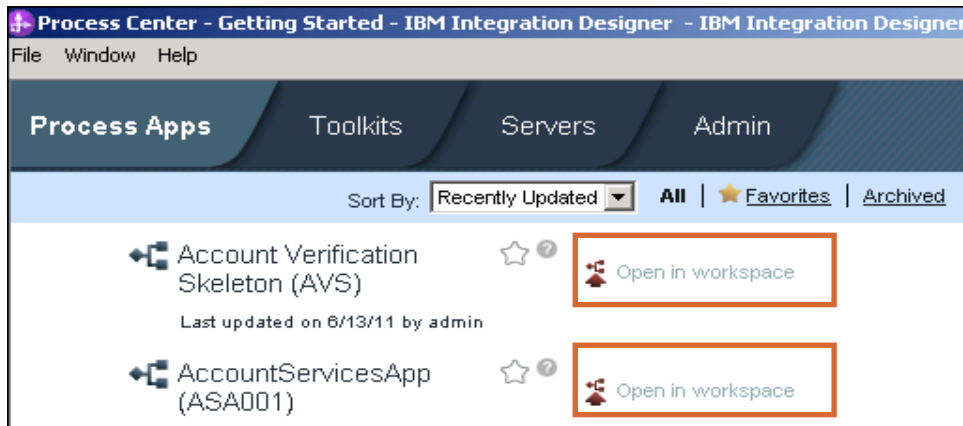
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Importing from the IBM Process Center repository

## Importing from the IBM Process Center repository



- Import process applications and toolkits into your workspace from the Process Center repository
  - Can now use them with your modules and libraries
- Must be in the Process Center perspective to import the process application or toolkit into the workspace
- View and work with the newly imported workspace in the Business Integration perspective

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Figure 3-17. Importing from the IBM Process Center repository

WB754 / VB7541.0

### Notes:

You can import process applications and toolkits into your workspace from the IBM Process Center repository, and then you can use them with your modules and libraries.

To open the process application into a workspace in the Integration Designer, you must be accessing the IBM Process Center using the IBM Integration Designer.

***Instructor notes:***

**Purpose —**

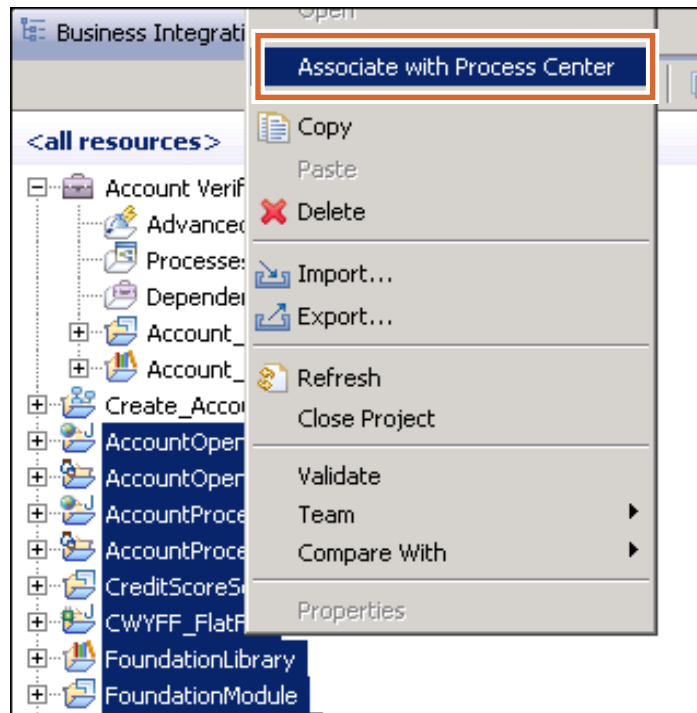
**Details —**

**Additional information —**

**Transition statement —** Next: Associating a module or library

## Associating a module or library

- Associate a module or library with a process application or toolkit to:
  - Add additional functions to the application
  - Take advantage of version control on the Process Center



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Figure 3-18. Associating a module or library

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### Notes:

You can associate a module or library with a process application or toolkit to add additional functions to the application, or to take advantage of version control on the IBM Process Center.

Suppose a module that contains a long-running process has been deployed to a process server and you now want to associate the module with a process application. In this case, you need to first consider whether you want to migrate your process instance:

- If you want to migrate the process instance, you must create a process version before you associate the module with the process application. You can create a process version by right-clicking your module in the Business Integration view and selecting New Process Version.
- If you do not want to migrate the process instance, you can proceed to associate the module with the process application.

There are wider implications to associating a module or library with a process application or toolkit than you might first see. Modules and libraries associated with toolkits can be shared

with other process applications in addition to the one in your workspace. Modules and libraries that are associated with process applications are also visible within the process application. Remember too that when you bring a process application or toolkit into your workspace, you may be bringing in a snapshot, which is a previous point in time.

***Instructor notes:***

**Purpose —**

**Details —**

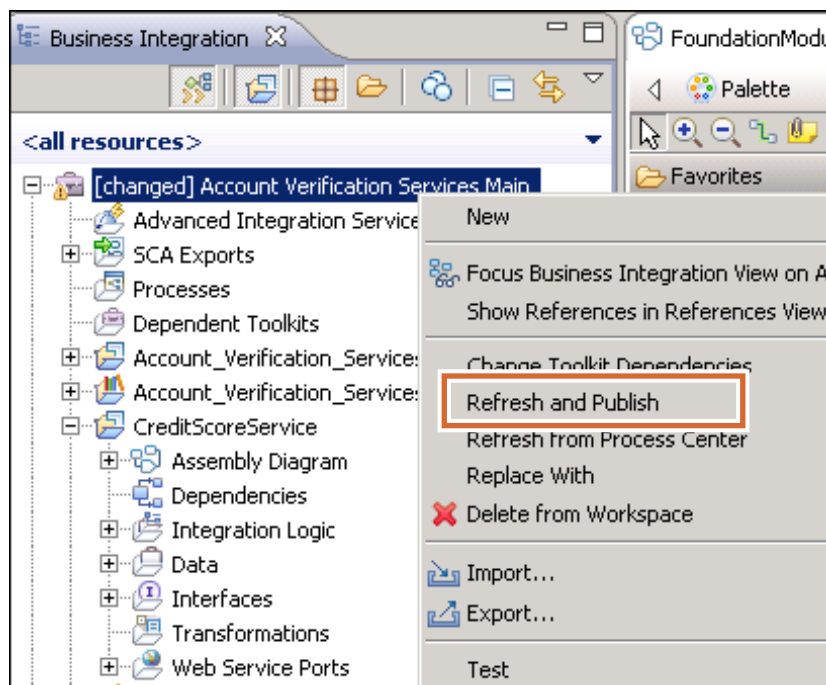
**Additional information —**

**Transition statement —** Next: Publish and synchronize



## Publish and synchronize

- The publish command updates the IBM Process Center with the changes in your workspace



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Figure 3-19. Publish and synchronize

WB754 / VB7541.0

### Notes:

As you update your process applications and toolkits, you need to likewise update the corresponding process applications and toolkits in the IBM Process Center with your changes. The publish command updates the IBM Process Center with the changes in your workspace.

The process application or toolkit is then updated. If there is a conflict because an element in your workspace and an element in the IBM Process Center are identical, then you are warned if you want to proceed. If you proceed, the element in the IBM Process Center is overridden.

While you are updating an artifact, another user might be updating the same artifact at the same time. To make sure that you are using the latest version of an artifact, you must synchronize the versions that exist in the workspace and the Process Center repository. When you try to publish the artifact to the IBM Process Center, synchronization automatically starts to merge changes into the workspace. If there is a conflict, the conflict shows in the synchronization dialog. You must resolve the conflict before you can publish your changes to the IBM Process Center. To make sure that you are using the latest

version of an artifact, you must synchronize the versions that exist in the workspace and the IBM Process Center repository. Select the file that contains the changes you want to keep, and then click **Commit** to publish your changes to the repository.

***Instructor notes:***

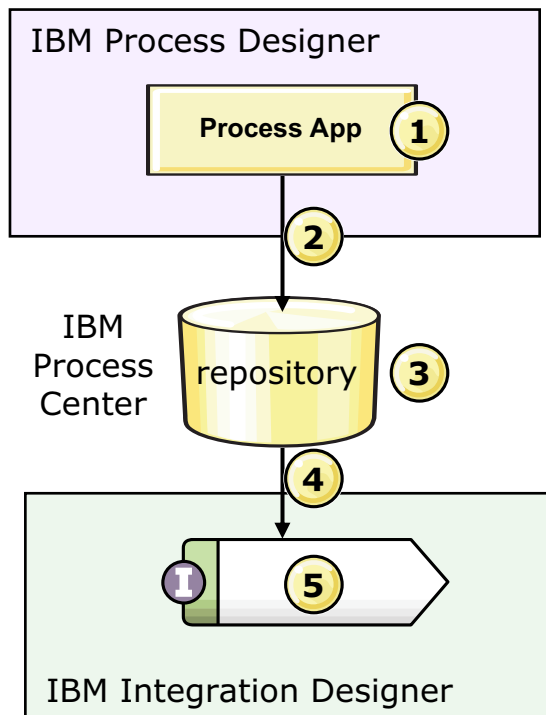
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: IBM Process Designer artifacts in IBM Integration Designer

## IBM Process Designer artifacts in IBM Integration Designer



1. Assets are built in IBM Process Designer.
2. A snapshot of asset is stored in IBM Process Center.
3. Developer uses Process Center perspective in IBM Integration Designer to read repository.
4. Click "Open in Workspace"
  - Assets are added to synchronized project.
5. Use business processes as export or import components.

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Figure 3-20. IBM Process Designer artifacts in IBM Integration Designer

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

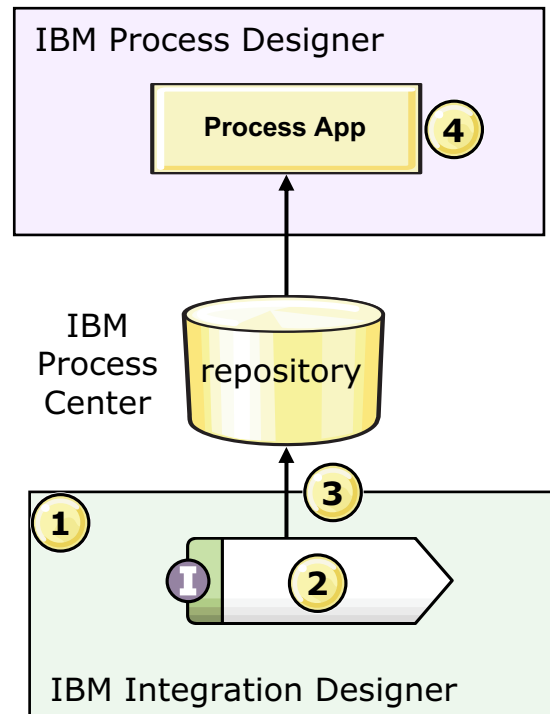
**Details —**

**Additional information —**

**Transition statement —** Next: IBM Integration Designer artifacts in IBM Process Designer

## IBM Integration Designer artifacts in IBM Process Designer

- Module associated with process app or toolkit.
- “Make operations visible to IBM Process Designer” on import or export component.
- Changes published to repository.
- Open updated process app or toolkit.
  - Imports and exports appear as “Advanced Integration Service” implementations
  - Supporting artifacts, such as business objects, are read-only



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Figure 3-21. IBM Integration Designer artifacts in IBM Process Designer

WB754 / VB7541.0

### Notes:

***Instructor notes:***

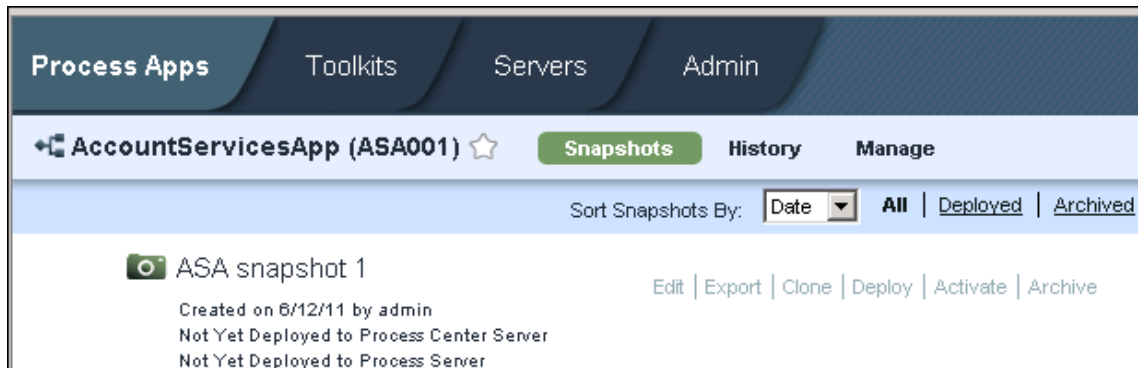
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Deploy

## Deploy



- Snapshots can be deployed to IBM Process Servers connected to the IBM Process Center
- Both the IBM Process Center server and the IBM Process Server where the application is being deployed must be running
- When deployed, dependencies are deployed as well

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Figure 3-22. Deploy

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### Notes:

Snapshots can be deployed to IBM Process Servers connected to the IBM Process Center. Both the IBM Process Center server and the IBM Process Server where the application is being deployed must be running.

When deployed, dependencies are deployed as well.



***Instructor notes:***

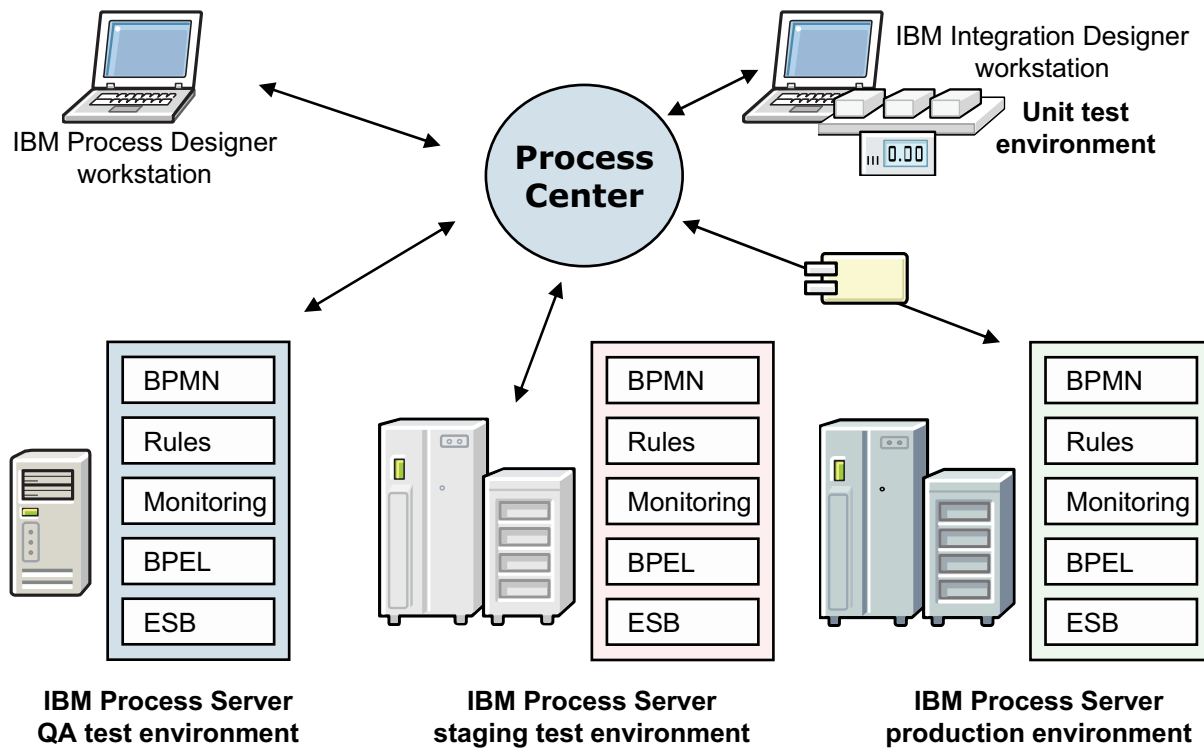
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Typical development and deployment scenario

## Typical development and deployment scenario



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Figure 3-23. Typical development and deployment scenario

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### Notes:

The diagram displays a typical development and deployment topology.

There is a unit test environment with IBM Integration Designer installed in a UTE environment. In this mode, the unit tester can test SCA modules locally in the IBM Process Server running inside the UTE or test them directly on the Process Center. Either way, it is fine depending on the requirements.

There is also an IBM Process Designer workstation that communicates directly with the Process Center Console in the center.

There are independent QA, staging, and production environment each with their own full stand-alone IBM Process Server connected to the central IBM Process Center. Artifacts are being published and synchronized back and forth between all the environments while the IBM Process Center is managing the central repository.

This scenario is just a sample, and the topology can be modified to suit the organization requirements.

***Instructor notes:*****Purpose —**

**Details —** Mention that having multiple IBM Process Centers is also an option, depending on how scalable the solution is needed. Also, mention that for the lab image, students use UTE IBM Process Server for all the labs testing since the VMware image is limited by resources. Testing and pushing all the artifacts directly to the IBM Process Center could be another solution. However, since that would require both the servers to run at the same time, it was not feasible to do so.

**Additional information —**

**Transition statement —** Next: Unit summary

## Unit summary

Having completed this unit, you should be able to:

- Describe the purpose and business value of IBM Process Center
- Define the various components of IBM Process Center
- Describe how to use IBM Process Center Console to deploy, test, and manage BPM applications

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Figure 3-24. Unit summary

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Checkpoint

## Checkpoint questions

1. True or False: There are only two ways of accessing the IBM Process Center console. The first is through IBM Process Designer and the second is through a web browser using the Process Center URL.
2. True or False: Snapshots must be created before you can deploy a process application.
3. True or False: You can import both the toolkit and the process application inside an IBM Integration Designer workspace

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Figure 3-25. Checkpoint questions

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**Notes:**

Write your answers here:

- 1.
- 2.
- 3.

Suggested answers are included on the next page.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Checkpoint answers

## Checkpoint answers

1. **False.** There is a third way using the IBM Integration Designer perspective.
2. **True.**
3. **True.** You do that through the IBM Process Center repository

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Figure 3-26. Checkpoint answers

WB754 / VB7541.0

### **Notes:**



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** The next slide is Exercise: Exploring IBM Process Center

## Exercise

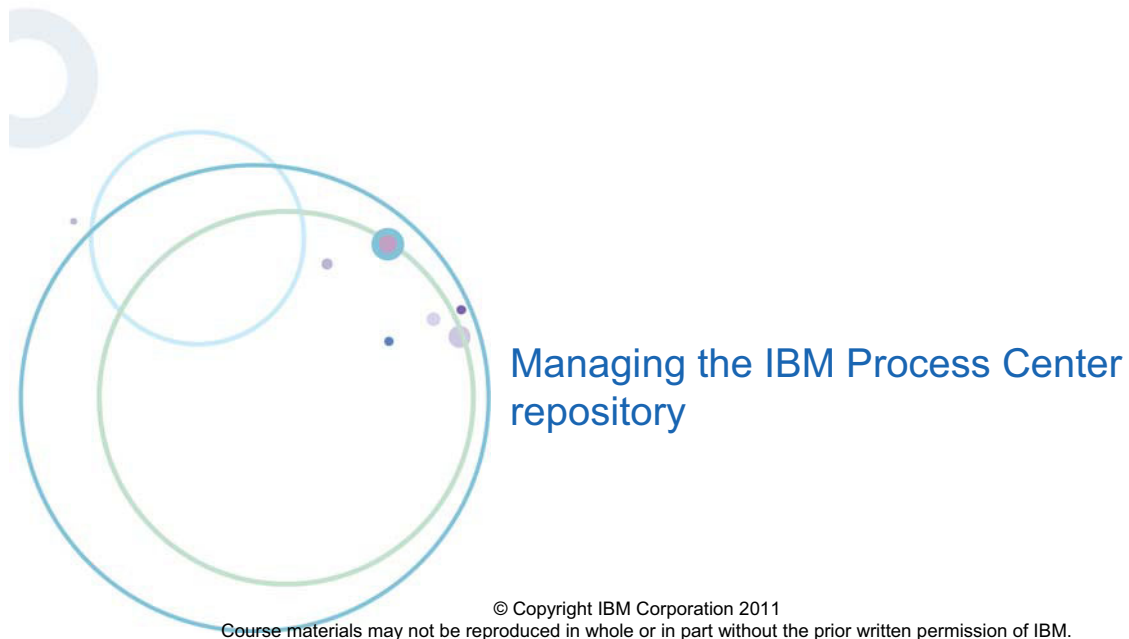


Figure 3-27. Exercise

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Exercise objectives

## Exercise objectives

After completing this exercise, you should be able to:

- Explore the IBM Process Center repository
- Create a BPM toolkit in IBM Process Center
- Associate IBM Integration Designer artifacts with the toolkit
- Generate access to process applications and toolkits

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Figure 3-28. Exercise objectives

WB754 / VB7541.0

### **Notes:**

***Instructor notes:***

**Purpose** — List the exercise objectives.

**Details** —

**Additional information** —

**Transition statement** —



## Unit 4. Implementations - Core process artifacts

### Estimated time

01:15

### What this unit is about

This unit describes the implementation of core BPM artifacts in IBM Business Process Manager Advanced V7.5.

### What you should be able to do

After completing this unit, you should be able to:

- Compare and contrast process applications and toolkits in IBM Process Designer with modules and libraries in IBM Integration Designer
- List and describe the core notation elements used in Process Designer
- Examine a defined workflow from detailed process requirements and identify the interrelated process activities and the roles that are responsible for completing them
- Decompose activities into processes and nested processes that contain process tasks
- Create a BPD from the process and nested process tasks and responsible roles
- Compare and contrast business processes between IBM Process Designer and IBM Integration Designer
- Identify the purpose and advantages of using the SDO framework
- Define the data objects and data graphs SDO framework components in IBM Integration Designer
- Compare and contrast data objects between IBM Process Designer and IBM Integration Designer

## Unit objectives

After completing this unit, you should be able to:

- Compare and contrast process applications and toolkits in IBM Process Designer with modules and libraries in IBM Integration Designer
- List and describe the core notation elements used in Process Designer
- Examine a defined workflow from detailed process requirements and identify the interrelated process activities and the roles that are responsible for completing them
- Decompose activities into processes and nested processes that contain process tasks

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---

Figure 4-1. Unit objectives

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### **Notes:**



***Instructor notes:***

**Purpose** — List the unit objectives

**Details** —

**Additional information** —

**Transition statement** —

## Unit objectives (continued)

After completing this unit, you should also be able to:

- Create a BPD from the process and nested process tasks and responsible roles
- Compare and contrast business processes between IBM Process Designer and IBM Integration Designer
- Identify the purpose and advantages of using the SDO framework
- Define the *data objects* and *data graphs* SDO framework components in IBM Integration Designer
- Compare and contrast data objects between IBM Process Designer and IBM Integration Designer

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---

Figure 4-2. Unit objectives (continued)

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### **Notes:**

***Instructor notes:***

**Purpose** — List the unit objectives

**Details** —

**Additional information** —

**Transition statement** —

## Topics

- Container artifacts
- Data artifacts
- Business process artifacts

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Figure 4-3. Topics

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### **Notes:**

***Instructor notes:***

**Purpose** — List the topics in this unit

**Details** —

**Additional information** —

**Transition statement** —



## **4.1. Container artifacts**

### **Instructor topic introduction**

## Container artifacts



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Figure 4-4. Container artifacts

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### Notes:



***Instructor notes:***

**Purpose** — Introduce the topic

**Details** —

**Additional information** —

**Transition statement** —

## Containers in IBM Business Process Manager

- Containers are used to capture business process artifacts
  - IBM Integration Designer uses modules and libraries
  - IBM Process Designer uses process apps and toolkits
- Some containers are shareable
  - Conversely, some containers have a dependency upon shared assets
- Containers provide abstract packaging for artifacts
  - At run time, may translate to physical packaging
- Types of containers:
  - Deployable (process apps and modules)
  - Shareable (toolkits and libraries)
  - Mediating (mediation modules)
  - Project (integration solution)

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Figure 4-5. Containers in IBM Business Process Manager

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### Notes:

***Instructor notes:***

**Purpose** — Introduce the topic

**Details** —

**Additional information** —

**Transition statement** —

## Comparing containers

### IBM Integration Designer

- **Modules**
  - Contain process artifacts such as data and implementations
  - Contain interfaces and optional Java code
  - Deployed to the server for execution
- **Libraries**
  - Contain reusable process artifacts
  - Can be shared with other containers
  - Are not deployed to the server
  - Can be globally shared
- **Mediation modules**
  - Capture mediation activities for WebSphere Enterprise Service Bus
- **Integration solution**
  - Visual representation of solution

### IBM Process Designer

- **Process apps**
  - Contain process artifacts such as data, implementations
  - Do not support WSDL-type interfaces or stand-alone Java code
  - Installed or deployed for execution
- **Toolkits**
  - Contain reusable process artifacts
  - Can be shared with other containers
  - Are not deployed to the server
  - Do not support globalized sharing
- **Mediation modules**
  - Not supported
- **Integration solution**
  - Not supported

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Figure 4-6. Comparing containers

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### Notes:

***Instructor notes:***

**Purpose** — Introduce the topic

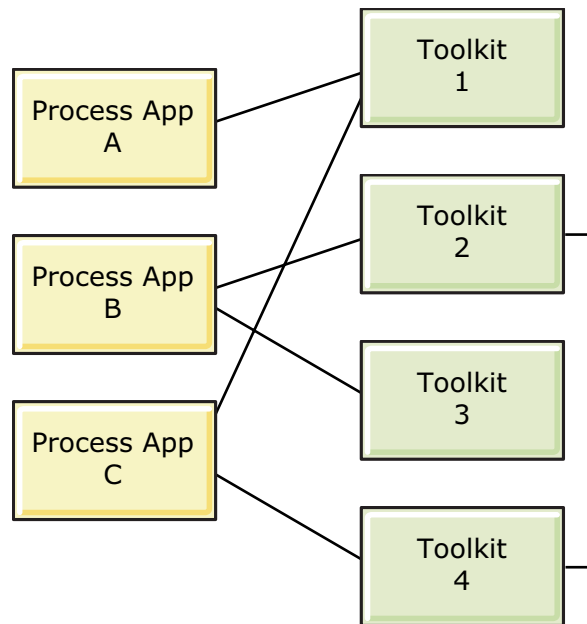
**Details** —

**Additional information** —

**Transition statement** —

## Relationship of process apps to toolkits

- Process Apps are the containers for the process models and supporting implementations.
- Toolkits enables IBM Process Designer users to share library items across process applications.
- One or more process applications can share library items from one or more toolkits.
- Toolkits can also share library items from other toolkits.



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Figure 4-7. Relationship of process apps to toolkits

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### Notes:

Process apps and toolkits in IBM Process Designer are analogous to modules and libraries in IBM Integration Designer. Some of the similarities include:

- Process apps (like modules) are deployed to the server
- Toolkits (like libraries) are not deployed to the server
- Process apps contain business process modeling artifacts
- Process apps may have dependencies on any number of toolkits
- Toolkits may have dependencies on other toolkits

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Runtime management of containers

- IBM Process Server
  - Libraries are packaged as JAR files
  - Library JAR files are copied to each dependent module
  - Modules are packaged as EAR files
  - Module EAR files (with dependent JAR files and other assets) are deployed
- IBM Process Center
  - Process apps and toolkits are stored in the repository
  - Process apps are installed on Process Center, or deployed to Process Server
  - Toolkits are not installed nor deployed
  - Process apps which contain SCA components:
    - SCA module packaged as EAR
    - SCA module used for playback in Process Center (automatic)
    - SCA module deployed in the process app (automatically in Process Server)

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Figure 4-8. Runtime management of containers

WB754 / VB7541.0

### Notes:



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## **4.2. Data artifacts**

### **Instructor topic introduction**

## Data artifacts



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Figure 4-9. Data artifacts

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose** — Introduce the topic

**Details** —

**Additional information** —

**Transition statement** —

## Data objects in IBM Business Process Manager

- IBM Integration Designer
  - Provides support for modeling and developing integrated data objects
  - Based upon industry-standard Service Data Object (SDO) framework
  - Data schema modeled with XSD, visible to user
  - Instances of `commonj.sdo.DataObject` at run time
- IBM Process Designer
  - Provides support for modeling data objects
  - Implementation kept hidden from user
  - SDO objects are not supported
  - Business graphs are not supported, consequently:
    - There are no change summaries
    - Disconnected data model is not supported
    - Command event model is not supported
  - Data objects are stored as XML blobs in the IBM Process Center repository
  - Data objects become instances of Javascript objects at run time
  - Data objects may be exported as XML for use in IBM Integration Designer

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Figure 4-10. Data objects in IBM Business Process Manager

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose** — Purpose

**Details** — Details

**Additional information** — Additional information

**Transition statement** — Transition statement Next: Unit summary

## Data objects in IBM Integration Designer

- Data objects are the fundamental structures for representing business data
- A data object holds data as a set of properties
- Each data object provides read and write access to properties through:
  - Getters and setters
  - XPath (XML Path Language)
- Properties can be:
  - Primitive data types (such as strings)
  - Commonly used data types (such as dates)
  - Multivalued fields (such as arrays)
  - Other data objects
- In memory, data objects are represented as instances of `commonj.sdo.DataObject`
  - Objects serialized to XML

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Figure 4-11. Data objects in IBM Integration Designer

WB754 / VB7541.0

### Notes:

The fundamental concept in the SDO architecture is the data object. It is not uncommon to see the term “SDO” used interchangeably with “data object”. A *data object* is a data structure that holds primitive data, multi-valued fields (other data objects) or both. The data object also holds references to metadata that provides information about the data included in the data object. In the SDO programming model, data objects are represented by the `commonj.sdo.DataObject` Java interface definition. This interface includes method definitions that allow clients to get and set the properties associated with the **DataObject**. As an example, consider modeling customer data with an SDO data object. The properties associated with the customer might be: **firstName(String)**, **lastName(String)**, and **customerID(long)**. This sample shows how you would use the **DataObject** API to get and set properties for the customer data object:

```
DataObject customer = ...  
customer.setString("firstName", "John");  
customer.setString("lastName", "Doe");  
customer.setInt("customerID", 123);  
int id = customer.getInt("customerID");
```



## **Instructor topic introduction**

## Service Data Objects (SDO) in IBM Integration Designer

- SDO provides a framework for data manipulation.
  - SDO API unifies representation of data from multiple sources.
  - No need to know multiple technology-specific APIs
- SDO framework supports a disconnected programming model (manipulate data without connection to source).
- SDO is integrated with XML.
- The key components of the SDO framework are: data objects, data graphs, and data object metadata.

Component	Description
Data object	Fundamental data structure for representing business data.
Data graph	A container for a hierarchical set (tree) of data objects.
Data object metadata	Metadata is the schema definition of the object; it contains information about the data in the data object (property types, relationships, constraints, and so on).

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Figure 4-12. Service Data Objects (SDO) in IBM Integration Designer

WB754 / VB7541.0

### Notes:

It is not uncommon for an enterprise application developer to know several data access technologies, such as: JDBC, XML, JMS, web services, and enterprise information systems. Unfortunately, developers must become experts in many different data access technologies.

The goal of SDO is to provide a programming model that unifies data representation across heterogeneous data sources, and simplify application development for developers and tools providers.

SDO provides a common API that can be used regardless of the back-end data store that is being accessed. This common way of representing data also makes SDO an ideal choice for data abstraction in a service-oriented architecture.

In addition, built into the SDO architecture is support for some common programming patterns. SDO supports a disconnected programming model. Typically a client might be disconnected from a particular data access service (DAS) while working with a set of business data. However, when the client completes processing, and needs to apply changes to a back-end data store by way of a DAS, a change summary provides the

appropriate level of data concurrency control. This change summary information is built into the SDO programming model.

Another important design point to note is that SDO integrates well with XML. As a result, SDO naturally fits in with distributed service-oriented applications.

Finally, SDO is designed to support both dynamic and static data access APIs. The dynamic APIs are provided with the SDO object model and provide an interface that allows developers to access data even when the schema of the data is not known until run time. In contrast, the static data APIs are used when the data schema is known at development time, and the developer prefers to work with strongly typed data access APIs.

SDO is a programming model that has been proposed jointly by IBM and BEA as JSR 235. Since that time, SDO architects have published revised specifications available at <http://www.osoa.org> and at <http://www.jcp.org>

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Business objects in IBM Integration Designer (1 of 2)

## Business objects in IBM Integration Designer (1 of 2)

- Business objects are the primary data structure for business data and data types defined in WSDL (interface) definitions
- Business objects are modeled using XML schemas (XSD)
  - Can import business object schema definitions from, or export to, other systems
  - Support for the full XML schema data type system
- At run time, business objects are represented in memory as an SDO instance using `commonj.sdo.DataObject`
  - Created from XSD files using the business object factory
  - Accessible using the SDO API and XPath
- Support is provided for data object schemas from industry standards organizations
  - HL7, ACORD, OAGIS, and so on
  - IBM BPM Industry Packs provide prebuilt data objects

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Figure 4-13. Business objects in IBM Integration Designer (1 of 2)

WB754 / VB7541.0

### Notes:

A business object is the primary structure for representing business data in the IBM Process Server run time. This structure also includes document literal message definitions as would be found in a WSDL definition when defining included data types. The business object relates to the `DataObject` construct in SDO. In fact, business objects are represented in memory as an SDO **`commonj.sdo.DataObject`**. Therefore, if you are doing development work that involves programmatically working with business objects, it is important to become familiar with the SDO APIs. Also, you might occasionally see a business object referred to as an SDO because the SDO **`DataObject`** is used to represent a business object in the client programming model.

Currently the only model for modeling or defining business objects is XML schema (XSD). Because the business object framework supports the full XML schema type system and facet capabilities, business object definitions created by third-party systems can be successfully imported and used in an IBM Process Server application module. Development teams that might have business objects defined using a model other than XML schema need to convert these business objects to XML schema for use in IBM Process Server.

IBM Integration Designer support for industry standard organizations extends beyond the ones mentioned here (HL7: Health Level Seven, ACORD: Association for Cooperative Operations Research and Development, OAGIS: Open Applications Group Integration Specification). For a complete list of supported industry schemas, consult the IBM Integration Designer Information Center.

Corresponding to the addition of support for industry standard schemas, IBM Integration Designer also gives you the ability to exclude libraries when cleaning a project. This feature is especially useful for artifacts that are stable, such as industry schemas. When you use the **Project > Clean** menu item to invoke a full build of projects in the workspace, the resources in all of the libraries are automatically revalidated. If you have libraries that contain large XML schemas or WSDL files, the process of revalidating the library resources can considerably add to the time required for the build to complete. However, if you have one or more libraries that contain large files and you do not expect the libraries to change, you can exclude them from the builds and then reduce the overall build time.

Working with industry standard schemas often means working with many business objects. In IBM Integration Designer, you can enter a filter in the parent category, allowing you to quickly search and find a wanted artifact. For example, if you have many business objects in the data types category, you can use inline filtering to quickly locate a specific business object. You can also mark artifacts as favorites, which do not get filtered, allowing you to tailor the Business Integration view to show only particular artifacts. These features are especially useful when working with industry schemas.

**xsd:anySimpleType** can now be used to refer to any XSD simple type, **xsd:anyType** can refer to any complexType or simpleType, while **xsd:any** can refer to any elements. **xsd:anyAttribute** can be used to refer to any XSD global attribute definition.

A field in a business object may be strongly typed, in which case its type and internal structure are known. Or it may be weakly typed, which means that the business object definition allows more than one type of data to occur in that field. The XML schema constructs *any*, *anyType*, and *anySimpleType* are the principal weak-typing constructs. Since a business object definition is realized as an XML schema, weak types occur when a business object definition uses one of the XML schema weak-typing constructs:

**xsd:any**

**xsd:anyType**

**xsd:anySimpleType**

***Instructor notes:***

**Purpose —**

**Details —**

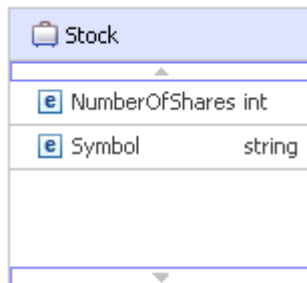
**Additional information —**

**Transition statement —** Next: Business objects in IBM Integration Designer (2 of 2)

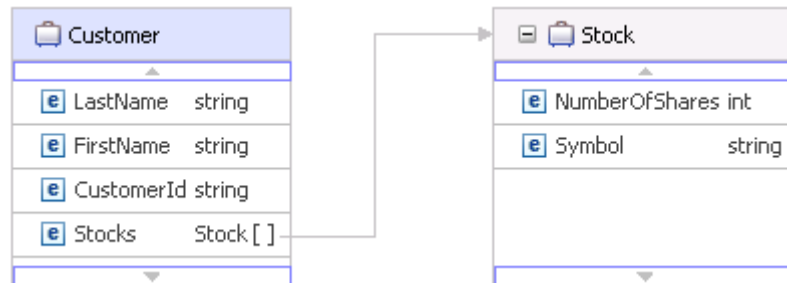
## Business objects in IBM Integration Designer (2 of 2)

- Business objects are collections of elements with names and data types
- There are two types of business objects:

1. Simple business objects composed of scalar (single-value) elements



2. Hierarchical business objects with elements that contain other (child) business objects



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Figure 4-14. Business objects in IBM Integration Designer (2 of 2)

WB754 / VB7541.0

### Notes:

There are two types of business objects. In the simplest case, a business object can be constructed of only scalar properties as is shown in the *Stock* business object. In addition, business objects can be defined to be hierarchical (composed of one or more properties that reference a nested business object definition).

The *Customer* business object shown on this slide has been included to illustrate an example of a hierarchical business object. In this example, each customer is associated with a collection of stocks. The data type for the *Stocks* property is the *Stock* business object, represented as an array.



***Instructor notes:***

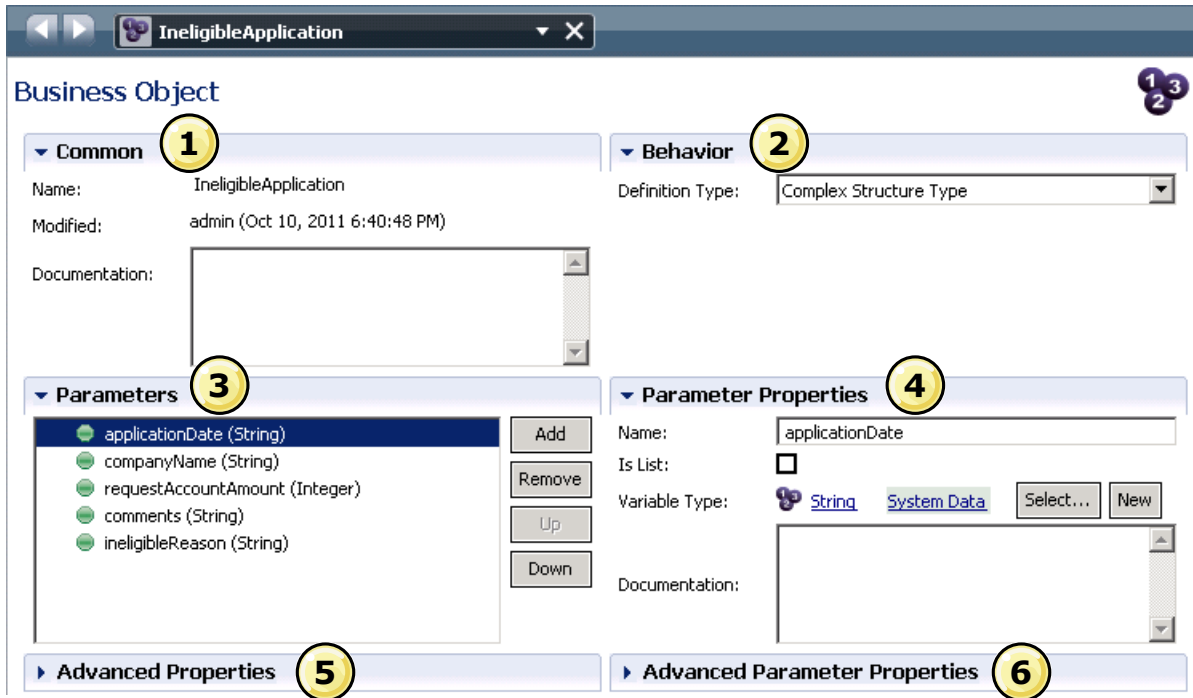
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Business objects in IBM Process Designer

## Business objects in IBM Process Designer



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Figure 4-15. Business objects in IBM Process Designer

WB754 / VB7541.0

### Notes:

1. **Common** properties, such as the business object name, modification date, modifier ID, and optional documentation. Documentation is arbitrary text which may be used to capture business-relevant information about the data.
2. **Behavior** properties. Either a **Simple** or **Complex** structure. A simple structure is composed of basic elements from the System Data library, such as String, Integer, and Boolean. A complex structure is made up of elements from any library, and from any other business object. In IBM Integration Designer, simple and complex business objects are implicitly inferred.
3. **Parameters**. A list of the attributes and type for each business object.
4. **Parameter properties**. Describe specific properties of the selected parameter. For example, you can change the name property, its variable type (with an option for creating a type) and optional, arbitrary documentation for the parameter. The type of property used is suffixed by the source library. You may also use this section to indicate whether the parameter is part of a list (array). In IBM Integration Designer, it is indicated by a square braces.

5. **Advanced properties** define options for XML serialization. These properties include the type name, namespace, element name, element namespace, and a button to view the business object as XML schema (which opens in a browser window).
6. **Advanced parameter properties** define options for advanced XML serialization, and for the selected parameter. Using this option, you may specify minimum and maximum number of occurrences, whether the variable is nullable, its order in the list (as an integer value) and specific XML serialization properties for the parameter itself.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Comparing data

### IBM Integration Designer

- **Data object**
  - Represented in XSD
  - Implicit simple and complex types
  - Uses SDO framework
  - Uses data graphs for integration
  - Supports disconnected data pattern
  - Supports command event model
  - `commonj.sdo.DataObject` run time

### IBM Process Designer

- **Data object**
  - Can be converted to XML
  - Explicit simple and complex types
  - Does not use standard framework
  - Does not support integration patterns
  - Does not support disconnected data pattern
  - Does not support command event model
  - Proprietary JavaScript object at run time

- Use for technical development, integration
- Use for high-level modeling

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Figure 4-16. Comparing data

WB754 / VB7541.0

### Notes:

Another important concept in the SDO architecture is the *data graph*. A data graph is a structure that encapsulates a set of data objects. From the top-level data object contained in the graph, all other data objects are reachable by traversing the references from the root data object.

Another important feature included in the data graph is a change summary that is used to log information about what data objects in the graph have changed during processing. In the SDO programming model, data graphs are represented by the `commonj.sdo.DataGraph` Java interface definition. In addition, the change summary information is defined by the **`commonj.sdo.ChangeSummary`** interface. A complete object model for SDO V1.0 is included in the specification document.

***Instructor notes:***

**Purpose** — Introduce the topic

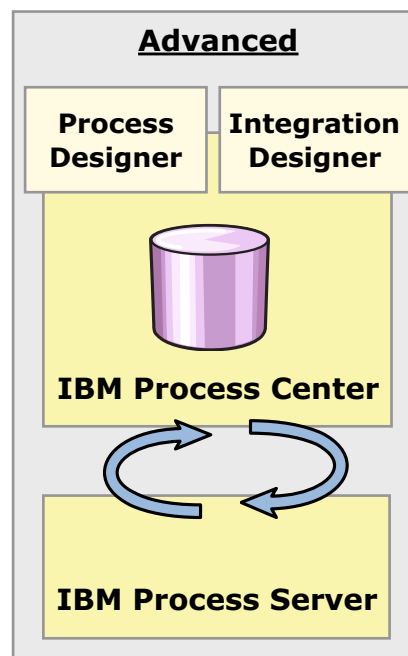
**Details** —

**Additional information** —

**Transition statement** —

## Using data objects from the repository

- Data objects are shared along with business processes and implementations
- Created in IBM Process Designer:
  - Association must be created in IBM Integration Designer
  - Business object converted to XSD
  - May be edited using IBM Integration Designer business object editor
- Created in IBM Integration Designer:
  - Must be published to Process Center
  - Converted into XML blob
  - May be edited using IBM Process Designer data editor



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Figure 4-17. Using data objects from the repository

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## **4.3. Business process artifacts**

### **Instructor topic introduction**

## Business process artifacts



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Figure 4-18. Business process artifacts

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose** — Introduce the topic

**Details** —

**Additional information** —

**Transition statement** —

## Business process definition (BPD) and Business Process Execution Language (BPEL) process

- The BPD in IBM Process Designer and the BPEL process in IBM Integration Designer both are the visual representation of actual business process.
- The basic functionality they offer is to capture a sequence of activities to build a workflow of an actual business model.
- Business process definitions are not BPEL

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Figure 4-19. Business process definition (BPD) and Business Process Execution Language (BPEL) process

WB754 / VB7541.0

### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Comparing business processes

### IBM Integration Designer

- **Business processes**
  - Represented in BPEL
  - Uses elements of BPMN
  - Separates process logic from implementation logic
  - Supports conditional and recursive logic
  - Supports looping constructs
  - Coordinate invocation of services
  - Manage faults, events, and compensation separately and distinctly in process
  - Coordinate services with correlation sets
  - Supports scope-specific variables
  - Uses interface and reference partners for coordinating services
  - Editor includes several pre-defined activities
- Use for technical development, integration

### IBM Process Designer

- **Business processes**
  - Captured as business process diagram
  - Uses elements of BPMN
  - Separates process logic from implementation logic
  - Supports conditional logic, not recursive
  - Supports while loops
  - Invoke implementation activities
  - Handles events, no distinct fault or compensation handling in process
  - Correlation managed internally
  - Variables not scope-specific
  - Does not support interface or reference partners
  - No pre-defined activities included
- Use for high-level modeling

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Figure 4-20. Comparing business processes

WB754 / VB7541.0

### **Notes:**

***Instructor notes:***

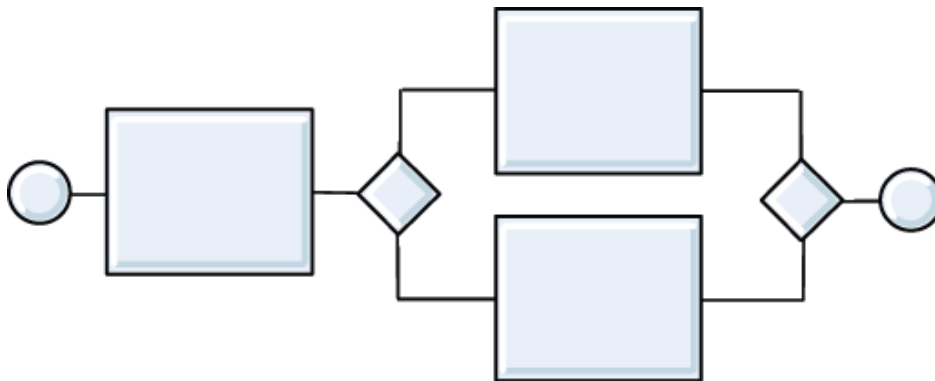
**Purpose** — Introduce the topic

**Details** —

**Additional information** —

**Transition statement** —

## Creating the initial process model



- If creating a process model during discovery of the business process, the process model must only reflect the captured data
- The process model need not concern itself with solving process pain points (problems) until analytical modeling
- The process model is agile enough for continued adjustments, so the focus is to have the expected order of process task reflected in the model first

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Figure 4-21. Creating the initial process model

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### Notes:

The process application implementation begins with the creation of a process model. The process model has an initial focus, capture the current state of the business process and model it to set the foundation for the next phases in modeling.

To understand how to create a process model that is incrementally adjusted through the playback sessions of the business process, follow these guidelines:

- If creating a process model during discovery of the business process, the process model only needs to reflect the captured data
- The process model does not need to solve process pain points (problems) until analytical modeling
- The process model is agile enough for continued adjustments, so focus on the expected order of process task reflected in the model first



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Automation

- Not the first order of business in process modeling
- Follow a natural development path:
  - Model the business process
  - Analysis of the business process pain points
  - Execution of specific functional requirements
- Be mindful of modeling a business process:
  - Automation does not solve inherent business problems

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Figure 4-22. Automation

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### Notes:

Careful attention needs to be given to the focus of the initial process model. Many times, organizations erroneously believe that BPM is about adding technology solutions to process problems as the first order of business. Soon after the initial sessions to document the business process, decisions to automate process tasks will be prematurely made. Automation certainly is a good thing in BPM; however it must not be the focus of modeling at this early stage. Allow the analytical modeling effort to designate opportunities to automate tasks. Modeling happens naturally as the iterations on the process model provide those opportunities to adjust and improve the business process.

***Instructor notes:***

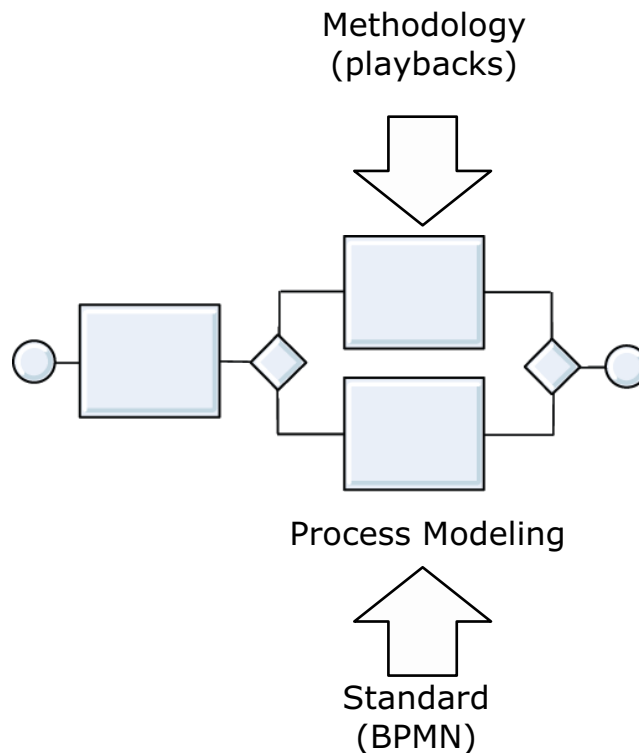
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Where to start



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Figure 4-23. Where to start

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### Notes:

So, where does a BPM team start in process modeling?

Process modeling is a diagram that reflects the ordered sequence of activities within a business process along with supporting information from start to end. In modeling, the business process is framed using a workflow model to reflect process activities, the roles performing those activities, conditional branching and the sequencing of the flow of work between activities. So where a BPM team starts is by adhering to the standards used in process modeling, Business Process Model and Notation, known as BPMN.

To communicate a process model clearly within an organization, the BPMN notation standard must be applied. Concurrent to using BPMN to model the business process, a BPM team uses a development methodology that works best to collaborate on modeling with the business groups: the playback methodology.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Process modeling guidelines in IBM Process Designer

- A process model is called a Business Process Definition or Diagram (BPD) in Process Designer
- A sub process is called a nested process or nested BPD in Process Designer
- In general, make a BPD as simple an abstraction as you can because a highly conceptual BPD is resilient to change
- Use Documentation in the Properties tab for each BPMN element in Designer to include important requirement notes

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Figure 4-24. Process modeling guidelines in IBM Process Designer

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### Notes:

These guidelines help to author process models in Process Designer:

- A process model is called a Business Process Definition or Diagram (BPD) in Process Designer
- A subprocess is called a nested process or nested BPD in Process Designer
- In general, a BPD needs to be as simple an abstraction as you can make it because a highly conceptual BPD is resilient to change
- Authors use the Documentation area in the Properties tab for each BPMN element in Designer to include important requirement notes

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## About BPMN tools in IBM Process Designer

- The standard flow chart-based notation for defining business processes
- Creates a standardized bridge for the gap between business process design and process implementation
- IBM Business Process Manager's Process Designer uses six core elements from BPMN
  - Activity
  - Event
  - Gateway
  - Flow
  - Pool
  - Lane



*Process Designer Element palette*

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Figure 4-25. About BPMN tools in IBM Process Designer

WB754 / VB7541.0

### Notes:

The primary goal of Business Process Modeling Notation (BPMN) is to provide a notation that is readily understandable by all business users. This notation is understandable from the business analysts that create the initial discovery maps of the process, to the developers responsible for implementing the process, and to the business people who manage and monitor the process. BPMN creates a standardized bridge for the gap between the business process design and process implementation. This single notation has been agreed upon among multiple BPM vendors for the benefit of the user community.

IBM Business Process Manager Process Designer authoring uses six core BPMN 1.2 elements:

- Activity, Event, Gateway, Flow, Pool, and Lane



***Instructor notes:***

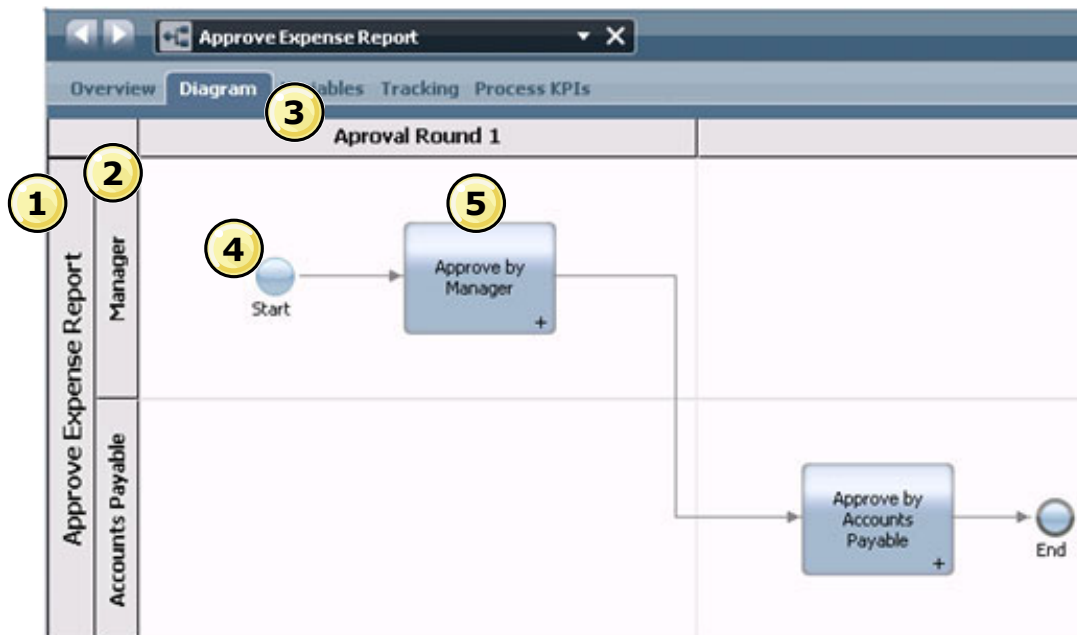
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## BPMN elements used in IBM Process Designer



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Figure 4-26. BPMN elements used in IBM Process Designer

WB754 / VB7541.0

### Notes:

#### 1. Pools.

- In IBM Process Designer, the default setup for newly created process models, or BPDs, is one pool and two lanes. One lane represents a participant and the other a system lane. Each business process definition (BPD) is encapsulated as a graphical element called a *Pool*.
- A process that is modeled in the Designer authoring environment includes the default pool, which consists of lanes that you designate. It is a best practice to rename your pool after the business process it contains. So in essence, the pool is the BPMN element that represents the entire business process. It is the only element that is not found in the element palette but is, however, the default setup for all BPDs created in Designer.

#### 2. Lanes

- Lanes are horizontal blocks in the element palette and authors are free to add more lanes to the BPD as needed.

- There is a concern with too many lanes for a BPD because a process model is concerned with communicating the business process effectively. So remember, a BPD needs to be as simple an abstraction as can be modeled.
- Each lane represents a group of process participants, the process task responsible role captured in the discovery phase. Lanes provide context for a process model as each lane contains a series of activities that are assigned to a specific process participant or events that transpire in the process.
- To obtain the details for participants during discovery, BPM teams employ user stories to help determine which participants are responsible to perform specific process tasks. Each of these process participants is assigned to a lane when modeling the process. It is important to remember that a participant is a role, and not a person, in a process model.
- When it comes time to define business process tasks that are automated, there must be a way to communicate automated tasks in the process model. A participant assigned to a lane does not always have to be a responsible human role. Process participants assigned to lanes can also be systems. For example, the discovery phase captures business process tasks, such as performing a background check on a loan, that are completed by a system.
- Designer has a specific default lane to contain these sorts of automated tasks: the system lane. During the initial process model build, captured process tasks that are automated need to be represented as part of the system lane. Further automation of process tasks is designed as the process is improved and validated through the iterative playback project development. Process improvement and automation may mean system lane rearrangement from one BPD to another to indicate where efficiency is found for the entire business process.

### 3. Milestone

- When using Process Designer, an organization may or may not choose to use milestones. They do not provide functionality for process implementation in Designer, but are a good organizational framework for descriptive and analytical process modeling. Milestones are common in many process discovery and documenting tools such as Blueworks Live. If a process diagram is imported into the Designer from tools like Blueworks Live, the milestones appear in the BPD.
- Milestones are represented by vertical boxes in the Designer and contain various tasks correlated to the particular milestone. Process owners typically use milestones to indicate business process achievements and a BPM analyst could consider the milestone a good indicator for business intervals to capture data for reports.
- If a BPM team chooses to use milestones, the best practice is to name each milestone with a noun. Some example milestone naming conventions:
  - Approval
  - Orientation

- Application Processing

#### **4. Start and End events**

- The most common control flow objects for a process model are the start and end event. Just like the definition of an event in everyday life, an event is an occurrence during a process. In the initial process model, it is important that there is a start and end event represented.
- Each BPD created in the Designer must contain a single start event, and at minimum, one end event. The default for a newly created BPD in Process Designer contains one start and one end event. Start and end events, represented by circles, can also be found in the Designer element palette if additional end events need to be added to the process model. Start events trigger the initiation of the process through an input. Describe the start input in the properties tab documentation box provided for the start event. End events are reached in a process when a final decision from all activities or a partial set of activities has been reached.

#### **5. Activities**

- Another type of flow object is the activity. An activity in a process model represents a logical unit of work that can be completed by a human or a system during process execution. What is important to remember is that a good process model typically has an activity represent a single task accomplished by a process participant. Another topic in this unit deals with a nested process (subprocess) and how an activity can also represent multiple activities or tasks effectively in a process model.

***Instructor notes:***

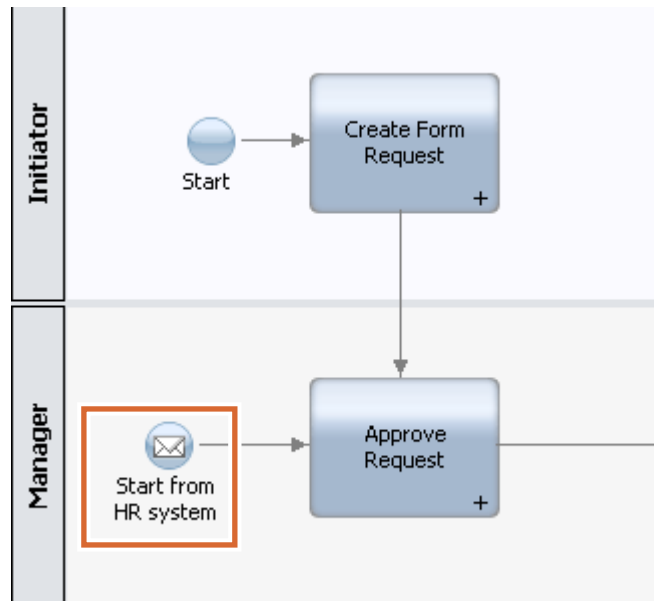
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Event handling in BPD



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Figure 4-27. Event handling in BPD

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### Notes:

You are only allowed one start event per BPD in the Process Designer. However, there are other ways to start a process. For example, you might have an external message coming into the process and to initiate the process. This external message start can be modeled with a Start Message event. Unlike the Start event, authors can have more than one Start Message event per BPD.

BPDs initiated through a Start Message event often happen when there are legacy systems supplying a newly implemented process model with data. Also, when an organization wants to gradually implement Business Process Manager. During this transitional period, the process can be started through Business Process Manager with the Start Event or when a legacy system inputs similar data to another process activity with the Start Message event. For example, 3 or 4 customer service agents use the Business Process Manager process application to input data into an insurance claim process. The service agents use the web form provided by Business Process manager and enter the data to continue the process. Another 10 customer service agents continue to use the old database system and enter information into the database. At an interval, the database sends information to the Business Process Manager process application, the start

message event initiates, and then the data is processed through the rest of the process model.

***Instructor notes:***

**Purpose —**

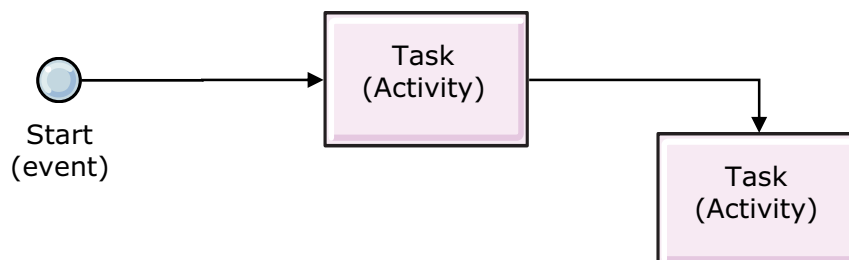
**Details —**

**Additional information —**

**Transition statement —**



## Connecting flow objects



- Click once to **anchor** on one flow object
- Then, drag the cursor to the next flow object and click once to **connect**
- Using the rule of thumb of top-down, left to right flow, connect flow objects from left to right or bottom to top on the flow objects. This top-down and left-to-right flow helps with the simplicity of the process model and helps keep flow lines from crossing.

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Figure 4-28. Connecting flow objects

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### Notes:

Now that flow objects are being added to the process model, it is necessary to provide the basic flow for these activities. It is represented by connection between flow objects in all of the process participant lanes. This type of diagramming provides communication of how the process flows from one activity to another and who performs those activities. To accomplish this task in Designer:

- Click once to anchor on one flow object, and then drag the cursor to the next flow object.
- Click once to connect.
- Using the rule of thumb of top-down, left to right flow, connect flow objects from left to right or bottom to top on the objects. This method helps with the simplicity of the process model and helps keep flow lines from crossing.

Because it is the early stage process model, it is only necessary to communicate the expected flow of the process from the start event to one activity to another and to the end event. As the process model is analyzed and adjusted, the process flow is modified to

express the nuances of alternate flow. In the next unit, process flow is discussed more comprehensively.

***Instructor notes:***

**Purpose —**

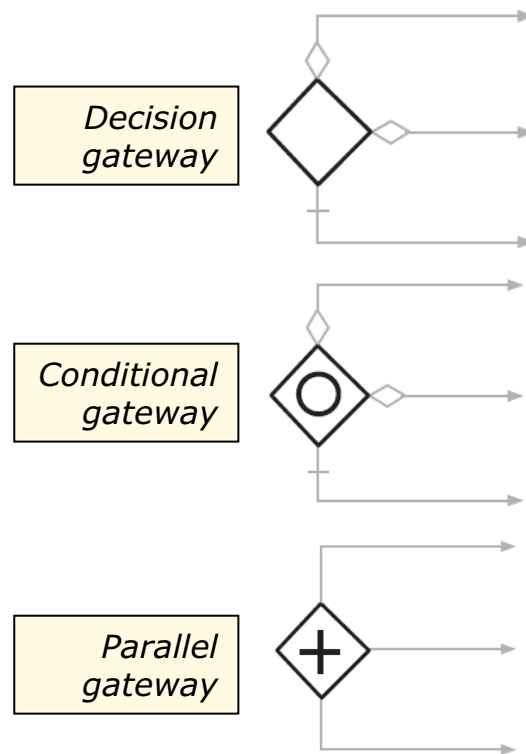
**Details —**

**Additional information —**

**Transition statement —**

## About Gateways

- Gateways determine the paths that a run time process can take.
  - Decision gateway (exclusive OR)
  - Conditional gateway (AND or OR)
  - Parallel gateway (AND)
- A gateway may split an incoming path into multiple outgoing paths known as a split
- A gateway merges multiple incoming paths into one outgoing path known as a join
- A good rule to remember when modeling splits and joins is one token into the process, one token out of the process



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Figure 4-29. About Gateways

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Translating business process work steps into activities

### Expense Reimbursement (sample steps):

1. Enter expenses
2. Scan receipts and attach
3. Submit for review or approval
4. Manager approval
5. Resubmit if rejected
6. Accounts payable approval
7. Resubmit if rejected
8. Submit for payment
9. Confirm receipt of payment
10. Transfer records to archive

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Figure 4-30. Translating business process work steps into activities

WB754 / VB7541.0

### Notes:

Capturing the process in the discovery phase does not necessarily mean that the work steps captured have been filtered into logical units of work. That depends on the depth of work done by those capturing and documenting the data. The better the process discovery, the easier the translation of work steps into process model activities.

Here is an example of work steps captured in a discovery session for the Expense Reimbursement process.

***Instructor notes:***

**Purpose —**

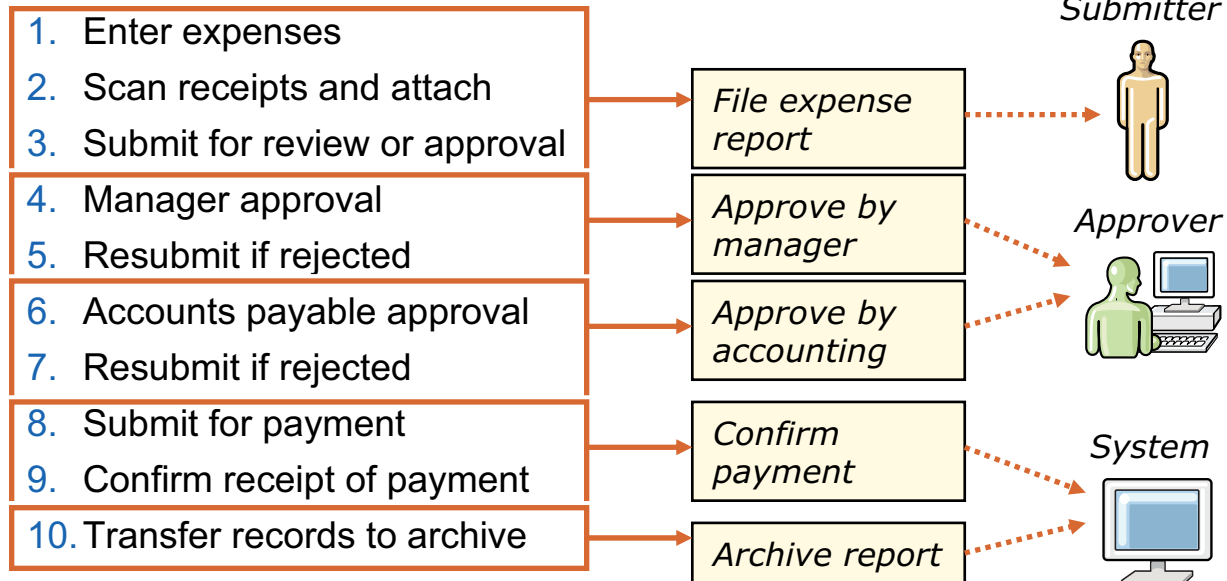
**Details —**

**Additional information —**

**Transition statement —**

## Translating business process work steps into activities

### Expense Reimbursement (sample steps):



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Figure 4-31. Translating business process work steps into activities

WB754 / VB7541.0

### Notes:

Here is how the work steps captured in process discovery were translated into process model activities. One process participant completing one logical unit of work. Notice that the activities or tasks are titled using a verb-noun statement. The work steps can be documented in each of the BPD activity properties tab.



***Instructor notes:***

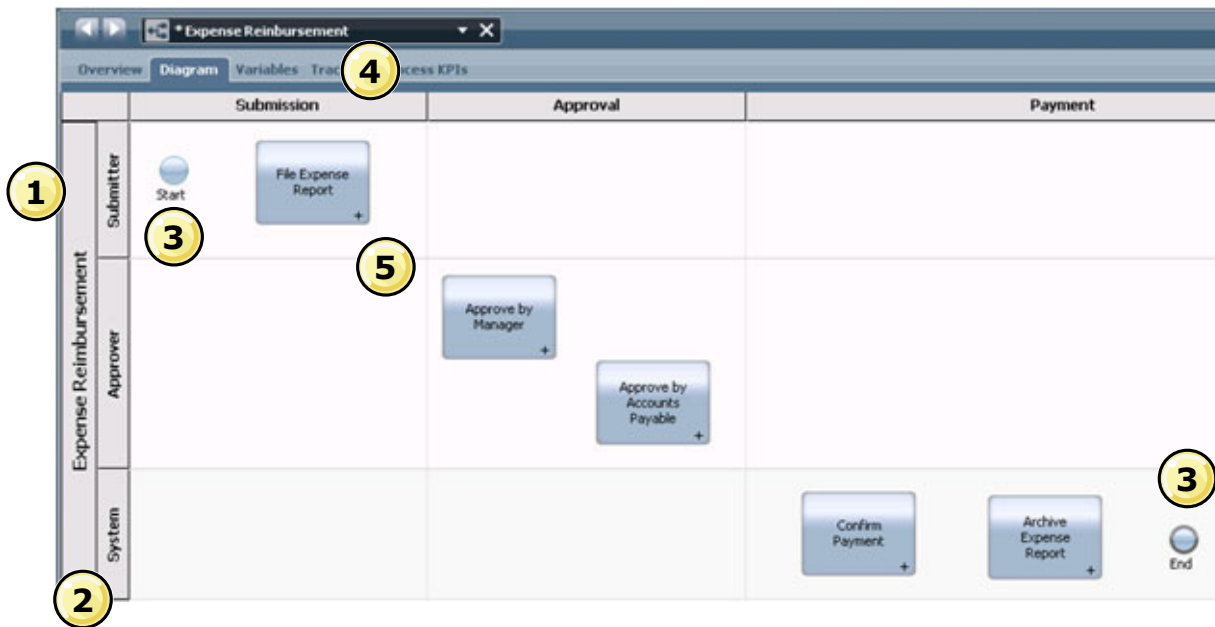
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Building BPD activities from requirement work steps



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Figure 4-32. Building BPD activities from requirement work steps

WB754 / VB7541.0

### Notes:

Now look at the initial process model with the activities from the work steps. How was the translation from the work steps to process activities performed?

1. The **pool** has been named *Expense Reimbursement*. Naming a pool does not offer any additional functionality, but it does make the process meaningful related to the work steps
2. There are three **lanes** to the BPD: one each for the *Submitter* and *Approver* roles, and one for the *System* (that is, automated) functionality.
3. A **start event** and **end event** were added from the design palette.

4. Three milestones are identifiable in this diagram: for *Submission*, *Approval*, and *Payment*. These milestones are reflected by the subdivision of the steps from the previous example.
5. The individual steps of the process have been broken down in to **activities**. These activities cover the major points of the process, and contain smaller substeps, realized by nested processes.

The activities need to be wired together to create the flow.

***Instructor notes:***

**Purpose —**

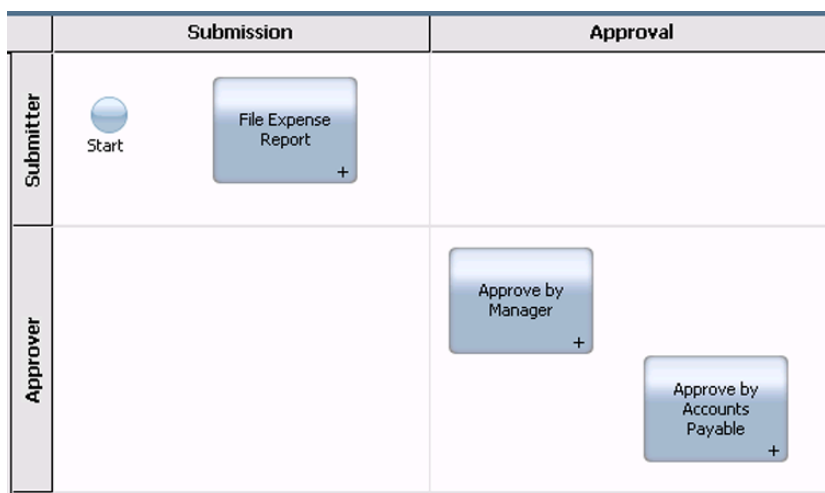
**Details —**

**Additional information —**

**Transition statement —**

## Guidelines for modeling activities

- Remember that activities represent logical units of work assigned to a process participant. If not initially, then eventually, activities in a BPD must be refined into those logical units of work.
- Convert multiple concurrent work steps assigned to one responsible role into one activity or task
- Use verb-noun statements to label activities



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Figure 4-33. Guidelines for modeling activities

WB754 / VB7541.0

### Notes:

When modeling activities in the Designer, here are some guidelines to follow:

- Remember that activities represent logical units of work assigned to a process participant. If not initially, then eventually activities in a BPD need to be refined into those logical units of work.
- Convert multiple concurrent work steps assigned to one responsible role into one activity or task.
- Use verb-noun statements to label activities.

***Instructor notes:***

**Purpose —**

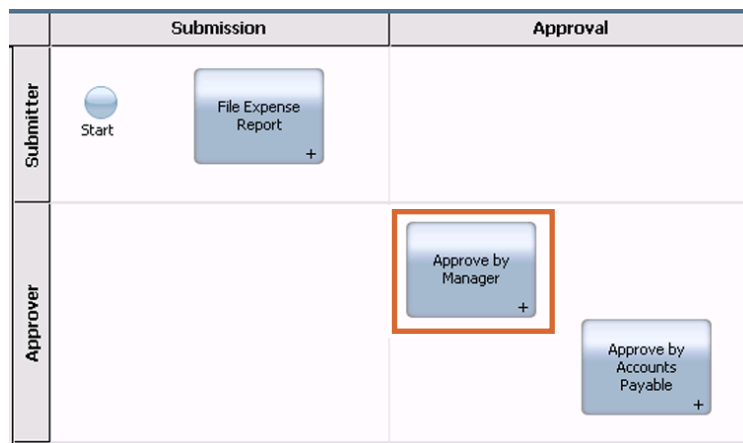
**Details —**

**Additional information —**

**Transition statement —**

## Guidelines for modeling activities

- A process model reads best when the definition has a top-down, left to right flow
- If you are using milestones in a BPD, make sure that the activities are aligned to each milestone. For example, the “Approval” milestone would naturally have the “Approve by Manager” activity in its quadrant of the model.



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Figure 4-34. Guidelines for modeling activities

WB754 / VB7541.0

### Notes:

When modeling activities in the Process Designer, here are some guidelines to follow:

- A process model reads best when the diagram has a top-down, left to right flow
- If you are using milestones in a BPD, align the activities to each milestone. For example, the **Approval** milestone would naturally have the “Approve by Manager” activity in its quadrant of the model

***Instructor notes:***

**Purpose —**

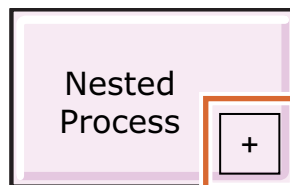
**Details —**

**Additional information —**

**Transition statement —**



## Nested processes and decomposition



- The BPMN element representation of an activity that is a nested process is a rectangle with rounded corners and a plus sign
- Decomposition helps provide details for a business process using a series of process model definitions (BPDs) that are connected as high level to child definitions (nested processes).
- Activities are decomposed into nested processes until single tasks are represented

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Figure 4-35. Nested processes and decomposition

WB754 / VB7541.0

### Notes:

To achieve effective communication of the process model, authors use decomposition to judge whether they are at simple abstractions of the model with single logical units of work for activities. Decomposition is basically showing details for a business process using a series of BPDs that are connected as high level to child diagrams. In essence, a flow object activity is also used as a container of child diagrams that in turn can have activities that also contain child diagrams. When the activities within the child diagram represent logical units for work, or tasks for each activity, then decomposition is no longer necessary.

Child diagrams in process models are subprocesses, or nested processes in Designer.

Is decomposition always necessary for process modeling?

Decomposition is only necessary if the process model is too complex to communicate the details of the business process and the activities do not necessarily equal logical units of work. Authors do not need to decompose if the process discovery produced the information that led to a simplified BPD.

***Instructor notes:***

**Purpose —**

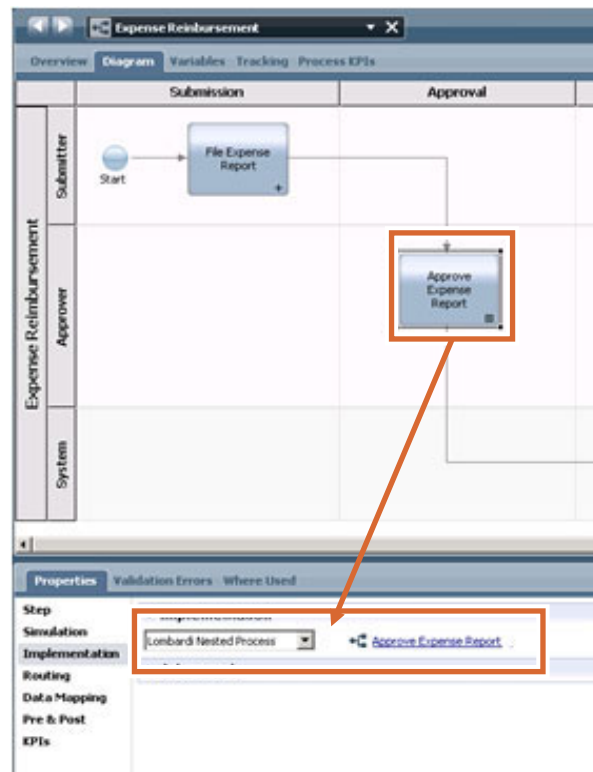
**Details —**

**Additional information —**

**Transition statement —**

## Nested process example

- Approval phase contains nested process: “Approve Expense Report”
  - Nested process contains two approval tasks: “Approve by Manager” and “Approve by Accounts Payable”
  - Now represents one logical unit of work
- Implementation of nested process indicates embedded BPD: “Approve Expense Report”.
- Follow link to examine structure of embedded BPD
- A nested process may exist in its own transaction, similar to setting a transactional boundary on a scope



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Figure 4-36. Nested process example

WB754 / VB7541.0

### Notes:

***Instructor notes:***

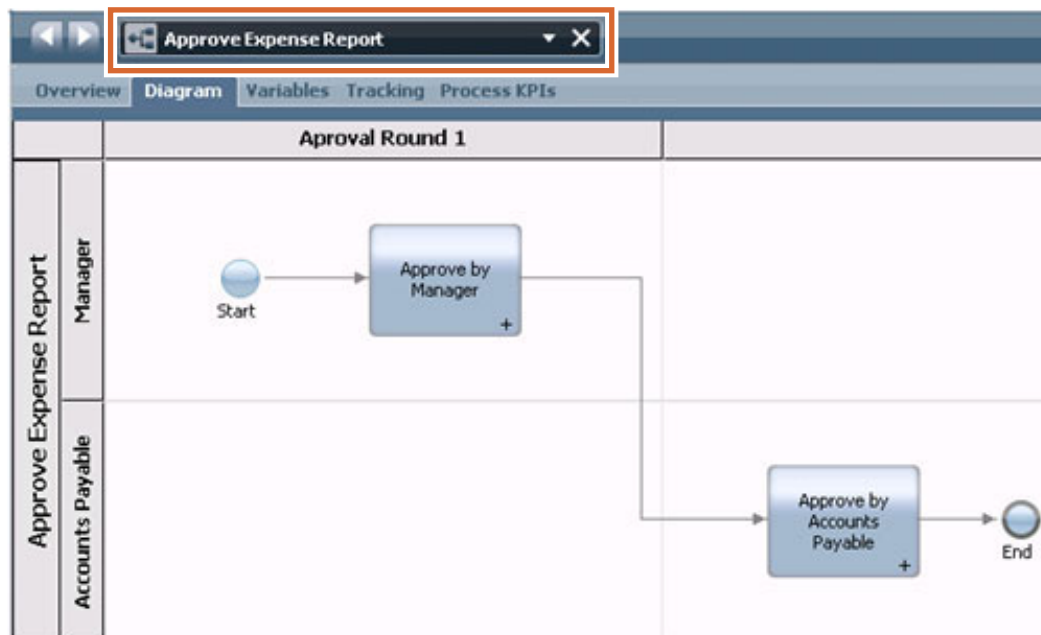
**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Nested process example



- A second BPD is now mapped as a nested process (or nested BPD) to a higher level BPD

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Figure 4-37. Nested process example

WB754 / VB7541.0

### Notes:

The second BPD must exist in order for the activity to be mapped to the nested BPD. In the second BPD, now a nested process, the process participants are narrowed down to two. Notice that the system lane does not exist in the nested process. To change a system lane to human lane, an author clicks the enabled toggle button “is system lane” to disable it in the properties tab for the lane. At that point, the lane can be rename to reflect the process participant needed. Now it is evident that the logical units of work and the proper process participant roles have been modeled effectively using decomposition.

***Instructor notes:***

**Purpose —**

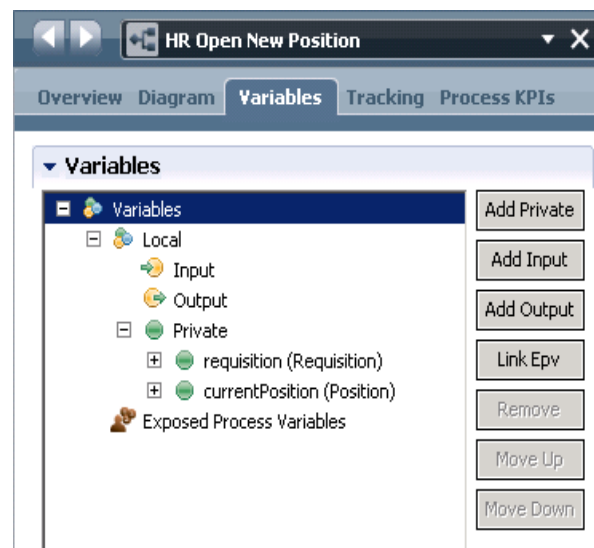
**Details —**

**Additional information —**

**Transition statement —**

## Handling variables in a business process diagram

- Like a BPEL, a BPD may have many variables
- Variables:
  - Are composed of data objects
  - Are global to the process, there are no scope-specific variables
    - Private variables are used internal to the process, but are not scope-specific
    - Input variables map to values used in the process
    - Output variables map to values to pass out of process, or to parent process
    - Exposed process variables may be set by users
  - Nested processes contain their own global variables
  - Variables may be copied into a nested process (requires programming)



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Figure 4-38. Handling variables in a business process diagram

WB754 / VB7541.0

### Notes:

Exposed process values (EPVs) are a special type of variable that you can create to enable users to set or alter values while an instance of a process is running. EPVs allow users to adjust specific variable values as constants. It affects the flow of a process, task assignments, and so on. If EPVs have been created, you can link them to multiple processes and services from the Variables tab in the Designer.

***Instructor notes:***

**Purpose —**

**Details —**

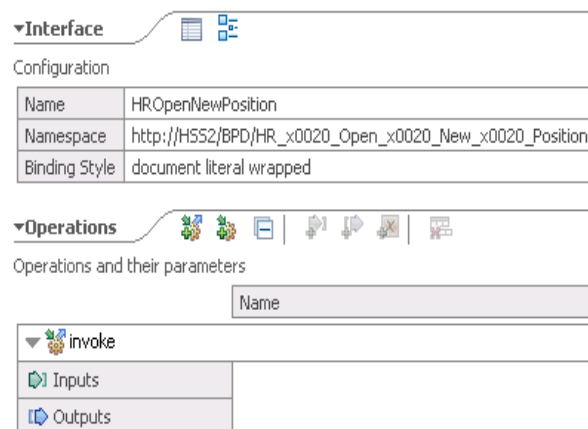
**Additional information —**

**Transition statement —**



## Interfaces

- IBM Process Designer does not support interfaces in the same way
  - Invocation in IBM Process Designer is implicit
  - Operations in an interface represent starting points in a business process diagram
  - Multiple interface operations are captured as multiple BPD start points
- Using a business process diagram in IBM Integration Designer
  - Start points are translated into interfaces
  - Default operation name is “invoke”
  - By default, two interfaces are created:
    - One for request-response operation
    - One for one-way operation
  - Namespace points to BPD in IBM Process Designer



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Figure 4-39. Interfaces

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Unit summary

Having completed this unit, you should be able to:

- Compare and contrast process applications and toolkits in IBM Process Designer with modules and libraries in IBM Integration Designer
- List and describe the core notation elements used in Process Designer
- Examine a defined workflow from detailed process requirements and identify the interrelated process activities and the roles that are responsible for completing them
- Decompose activities into processes and nested processes that contain process tasks

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Figure 4-40. Unit summary

WB754 / VB7541.0

### **Notes:**

***Instructor notes:***

**Purpose** — Summarize the learning points in the unit

**Details** — Repeat the unit objectives, or use another review to summarize the learning points

**Additional information** —

**Transition statement** —

## Unit summary (continued)

Having completed this unit, you should also be able to:

- Create a BPD from the process and nested process tasks and responsible roles
- Compare and contrast business processes between IBM Process Designer and IBM Integration Designer
- Identify the purpose and advantages of using the SDO framework
- Define the *data objects* and *data graphs* SDO framework components in IBM Integration Designer
- Compare and contrast data objects between IBM Process Designer and IBM Integration Designer

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Figure 4-41. Unit summary (continued)

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Checkpoint

1. Which of the following containers are provided in IBM Process Designer?
  - a) Process applications
  - b) Toolkits
  - c) Mediation modules
  - d) Integration solutions
2. True or false: modules may have many dependent libraries, but a process app may have only one dependent toolkit.
3. True or false: You may associate a toolkit with a library, edit the data objects in IBM Integration Designer, and then publish changes to IBM Process Center.
4. Which of the following concepts are found in IBM Integration Designer, but not in IBM Process Designer?
  - a) Decision gateways
  - b) Correlation sets
  - c) Interface and reference partners
  - d) Event handling

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Figure 4-42. Checkpoint

WB754 / VB7541.0

### Notes:

Write your answers here:

1.

2.

3.

4.

***Instructor notes:***

**Purpose** — Checkpoint questions to verify understanding

**Details** — These questions need to be multiple choice, true/false, or sequencing only so they can be repurposed in SPVC e-learning.

**Additional information** —

**Transition statement** —



## Checkpoint answers

1. **(a) and (b).** Mediation modules and integration solutions are not supported in IBM Process Designer.
2. **False.** A process app may have many dependent toolkits in IBM Process Designer.
3. **True.**
4. **(b) and (c).** Correlation is handled internally in IBM Process Designer, and there is no related concept of interface or reference partners.

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Figure 4-43. Checkpoint answers

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Exercise

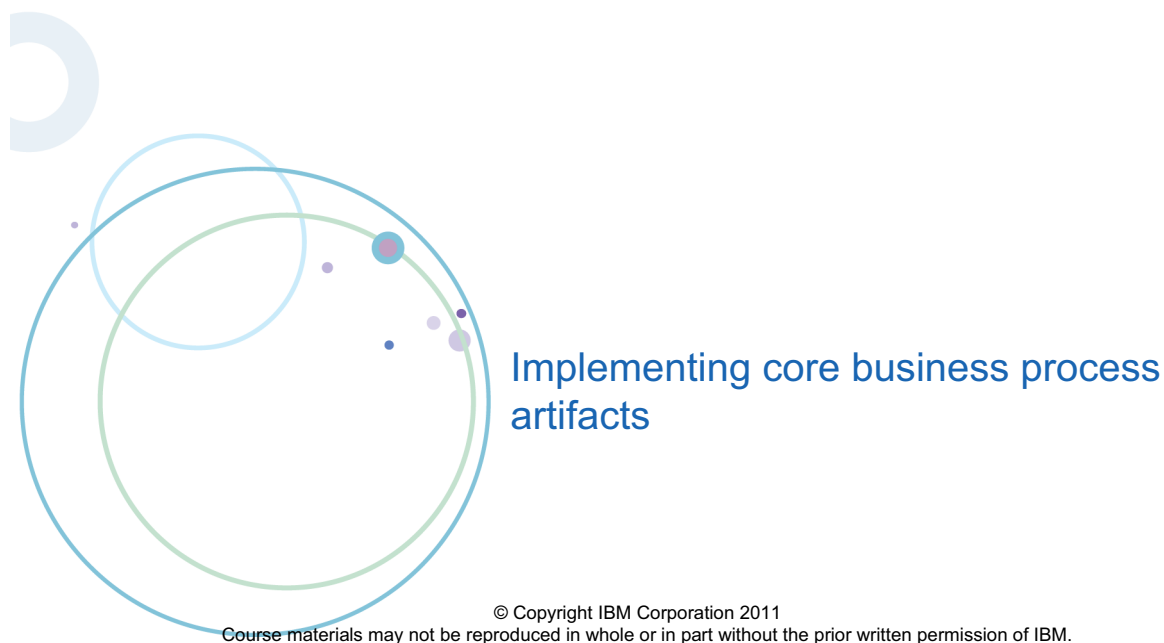


Figure 4-44. Exercise

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose** — Introduce the exercise.

**Details** — This slide provides an introduction to an exercise (such as a hands-on lab exercise, or team exercise).

**Additional information** —

**Transition statement** —

## Exercise objectives

After completing this exercise, you should be able to:

- Create a simple BPD in IBM Process Designer
- Create data objects to support a BPD in IBM Process Designer
- Compare business processes in IBM Process Designer to IBM Integration Designer
- Compare data objects in IBM Process Designer to IBM Integration Designer

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Figure 4-45. Exercise objectives

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### **Notes:**

***Instructor notes:***

**Purpose** — List the exercise objectives.

**Details** —

**Additional information** —

**Transition statement** —

## Unit 5. Implementations – Activity process artifacts

### Estimated time

01:30

### What this unit is about

In this unit, you learn about the implementation of BPM activity artifacts in IBM Business Process Manager Advanced V7.5.

### What you should be able to do

After completing this unit, you should be able to:

- Define the purpose and business value of using business rules
- Describe the support for JRules in IBM Process Designer
- Compare and contrast business rules between IBM Process Designer and IBM Integration Designer
- Describe the business value of human tasks
- Relate human task components to activities in a business process diagram
- Describe support for human task user interface generation in both IBM Process Designer and IBM Integration Designer
- Compare and contrast the implementation of human task components between IBM Process Designer and IBM Integration Designer

### How you will check your progress

- Checkpoint
- Machine exercise

## Unit objectives

After completing this unit, you should be able to:

- Define the purpose and business value of using business rules
- Describe the support for JRules in IBM Process Designer
- Compare and contrast business rules between IBM Process Designer and IBM Integration Designer
- Describe the business value of human tasks
- Relate human task components to activities in a business process diagram
- Describe support for human task user interface generation in both IBM Process Designer and IBM Integration Designer
- Compare and contrast the implementation of human task components between IBM Process Designer and IBM Integration Designer

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Figure 5-1. Unit objectives

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### Notes:



***Instructor notes:***

**Purpose** — List the unit objectives

**Details** —

**Additional information** —

**Transition statement** —

## Topics

- Business rules
- Human tasks
- Other implementations

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Figure 5-2. Topics

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## **5.1. Business rules**

### **Instructor topic introduction**

## Business rules



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Figure 5-3. Business rules

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### Notes:

***Instructor notes:***

**Purpose** — Introduce the topic

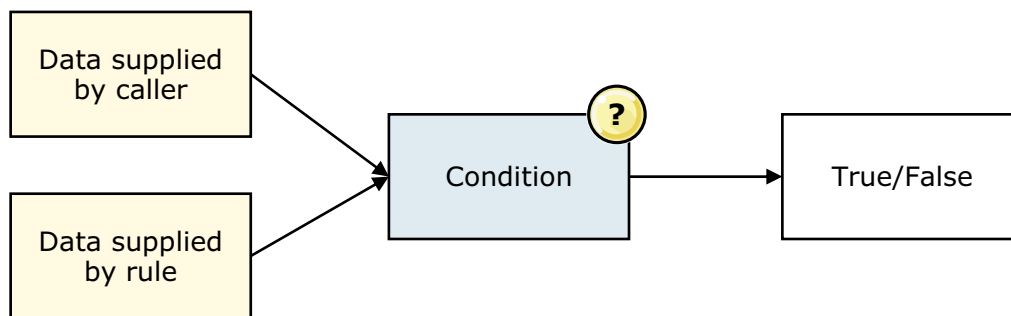
**Details** —

**Additional information** —

**Transition statement** —

## What is a business rule?

- A business rule captures and implements business policies and practices using one or more if-then statements
  - For example: If orderTotal  $\geq$  1000, then discount = 0.10
- A business rule consists of a condition (an expression using data supplied by the caller and by the rule) and one or more actions
  - The condition is the “if” portion of the statement
  - Evaluation of the condition is either true or false
  - The action is the “then” portion of the statement



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Figure 5-4. What is a business rule?

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### Notes:

When a business rule is executed, a series of conditions are evaluated and a series of actions performed. The outcome of the evaluation of the condition is a true or false value. An action is a simple piece of logic that can invoke a service, update a local variable or, as is most commonly the case, modify data that is returned to the caller. The action has access to both data supplied by the caller and data supplied by the rule.

A business rule is used to help abstract the client from implementation of the business logic. A calling client does not care how a business rule carries out its duties; it simply sends in the inputs and expects a result. Organization of rules is discussed next, but to set the stage, business rules are assembled into business rule groups and can be implemented in one of two ways, rule sets or decision tables.

Examples of business rules include:

- A rental car company is able to change corporate discount amounts during peak dates and times: summer, holidays, and so on.



- An insurance agency can invoke a process for an insurance claim that happened in the past. It could happen due to a company merger or through a change in company policy.
- Shipping rates might change based on destination (whether domestic or international), package weight and size, or the delivery priorities (overnight or next day).

***Instructor notes:***

**Purpose —**

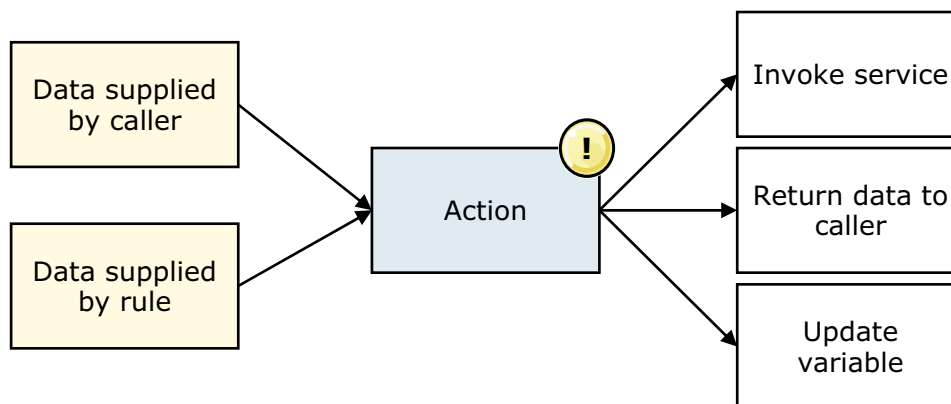
**Details —**

**Additional information —**

**Transition statement —** Next: Business rule actions

## Business rule actions

- Possible actions that result from evaluation of the condition:
  - Invoking a service
  - Updating a local variable
  - Modifying data that is to be returned to the caller
  - Creating or copying a business object
  - Returning (stop execution of the rules early)
  - And so on



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Figure 5-5. Business rule actions

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### Notes:

When the return statement is executed, evaluation of rules stops. Output variable values at the return point become the output of the rules.

***Instructor notes:***

**Purpose —**

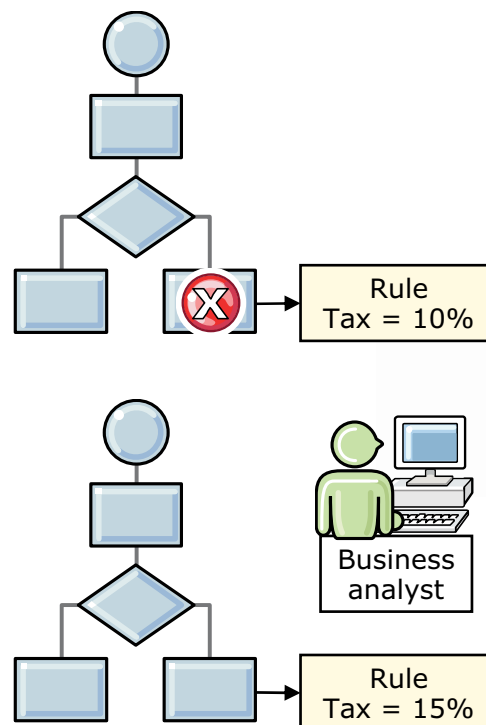
**Details —**

**Additional information —**

**Transition statement —** Next: Business value of rules

## Business value of rules

- By exposing rules as services using rule groups, rules are separated from processes that use them
  - Rule sets and decision tables are reusable
  - Multiple business processes can use the same sets of business rules
  - Rules are no longer in application code
- The business analyst can quickly change exposed rules at run time, providing business agility and responsiveness
  - You are no longer bound to IT development cycles if rules are not in application code
  - The developer is only needed for more complex changes



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Figure 5-6. Business value of rules

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### Notes:

Hardcoding values and decision points into a business process is undesirable. Business values that are subject to change would result in manual recoding of the process and redeployment of the solution. These manual activities are error prone and time consuming. IBM Process Server provides a much more elegant solution through business rules.

Decisions or values that affect the operation of a process can be externalized outside of the process. When these values are needed, the process asks for these values in a dynamic fashion by invoking the business rule service. The business rule values are maintained by IBM Process Server in a secure data store. They may be designed, configured, or modified at a high level through a specialized administrative web client. In principle, these values can be modified by suitable staff members without their having to know anything about the underlying technical characteristics of the solution.

Why do you need a business rule service component when BPEL has a choice activity? In BPEL, you can use activities such as choice, or receive choice; however, you are hardcoding the decision-making rules in the application. Whenever you hardcode logic, changes cannot be made easily or quickly.

By having a business rules component, the decision making logic can be separated from the business process. Multiple services can invoke the rules, and business rules become reusable. Changes in business rules (for example, the discount rate has been changed from 10% to 12%) would not result in changes in business processes.

Business rules help abstract the implementation (the actual work being done) from the client (the object calling the work to be done). Abstraction allows a company to change, update, and reuse code easily. This model of abstraction fits naturally within loosely coupled SOA processes. Once they are decoupled, it is easy for other SCA services to access business rules. For example:

- An analyst can change loan approval criteria without redeploying the application.
- Flexibility allows for quick responses to changing business conditions and customer demand.
- Rules are reusable: Multiple business processes can use the same set of business rules.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Rule sets defined

## Rule sets and decision tables

- Use rule sets when:
  - You want to fire multiple rules
  - You have several simple rules, each with one condition
- Use decision tables when:
  - You want to fire only one rule
  - You have complex rules with multiple conditions

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Figure 5-7. Rule sets and decision tables

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### Notes:

Use decision tables when you have rules with multiple clauses or variables in the condition statements. More importantly, use a decision table when you want to process only one rule.

Use rule sets when you have rules with a few clauses or variables in the condition statements, or you need to process multiple rules. (Evaluating sequentially can be inefficient when there are many rules.)

A developer typically does not have the authority to make business decisions involving rules (such as how much of a discount to give to certain types of customers). When you develop business rules, you must typically involve a business analyst.



***Instructor notes:***

**Purpose —**

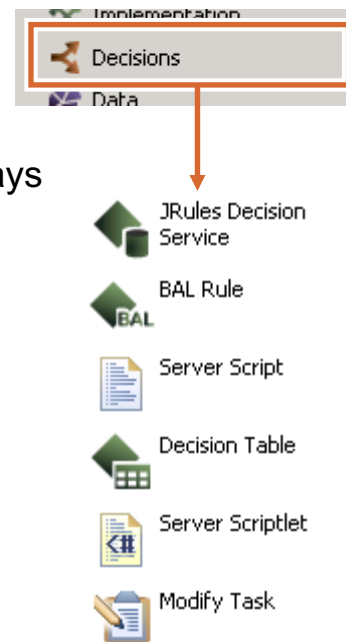
**Details —**

**Additional information —**

**Transition statement —** Next: Rule groups

## Business rules in IBM Process Designer

- Called “decision services”
- Attached to activity as implementation
- May be built in toolkits or process apps
- May be attached to activities or decision gateways
- Decision service may be composed of:
  - Business action language (BAL) rule
  - JRules decision service
  - Decision table
- May be augmented with scripts or scriptlets
- Arranged in a flow diagram



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Figure 5-8. Business rules in IBM Process Designer

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### Notes:

Build a Decision service when you want a decision or condition in a business rule to determine which process implementation is invoked. For example, when a certain condition evaluates to true, Process Designer implements the associated activity or action.

IBM Process Designer supports business rule authoring tasks as performed by business analysts and business users who are rule designers rather than programmers. Business rule designers can express business logic using rule syntax that resembles natural human language. This rule syntax is called Business Action Language (BAL), which is a declarative language that relates business concepts to business data and actions.

Business rules are an expression of business policy in a form that is understandable to business users and that can be executed by a rule engine. Business rules formalize a business policy into a series of “if-then” statements. In IBM Process Designer, business rules are included in a business process definition (BPD) by adding a Decision service to the process. Add a Decision service to a Process Application when the actions that take place in your process depend upon one or more conditions. For example, if an employee holds the position of Director and submits a meal expense for more than \$250, then you

can create a rule. Set a variable in that rule, such as *approvalRequired*, to route the process sequence flow into a specific approval activity.

A Decision service contains one or more components. There are three types of components:

- **BAL Rule:** You can use the rule editor in this component to author business rules using Business Action Language (BAL), a natural language technology.
- **JRules Decision Service:** IBM Business Process Manager integrates with IBM WebSphere ILOG JRules using the JRules Decision Service component. You can use this rule component to connect to and implement rule applications that are available on a JRules Rule Execution Server.
- **Decision Table:** The Decision Table component contains a rule table. Each row in the rule table represents a Boolean condition that evaluates to true or false at run time. When a rule evaluates to true, the JavaScript expression that you provide as the rule action is executed.

## ***Instructor notes:***

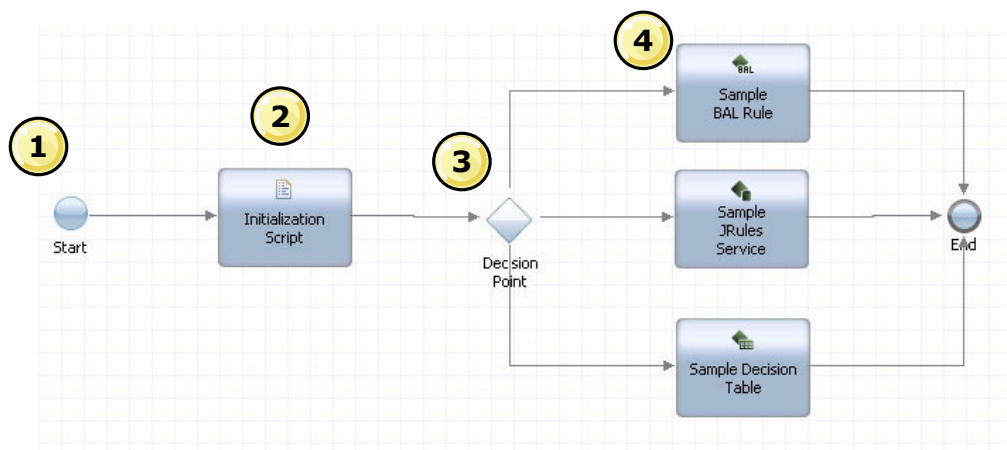
### **Purpose —**

**Details —** Business rules are perhaps one area in which IBM Process Designer has an advantage over IBM Integration Designer. Business rules in IBM Process Designer offer easy integration with ILOG JRules decision services, and offers different options for creating rules, such as tables, JRules, or BAL rules. BAL rules are fast becoming an industry standard for describing 'if-then' type business rules. Furthermore, business rules in IBM Process Designer may be designed in a flow diagram. In IBM Integration Designer, there is only a simple date-time-based decision making process to decide either one rule set or one decision table.

### **Additional information —**

### **Transition statement —**

## Sample decision service in IBM Process Designer



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Figure 5-9. Sample decision service in IBM Process Designer

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### Notes:

- Each decision service contains a start and end point, just as a business process service.
- A decision service contains rule activities, such as BAL rules, JRules, decision tables, and scripts.
- Each decision service may be composed of conditional decision points
- Rules may be defined in BAL rule components, JRules components, or decision tables. BAL rules are analogous to rule sets, except they use the business action language.

Tools available in the decision service editor include:

- JRules decision service
- BAL rule
- Decision table
- Server scriptlet

- Server script
- Modify task (use this tool to set due dates, priorities, and assignments on tasks)
- Decision gateway
- Start and end events
- Note (use this tool to add an arbitrary text note to the diagram)
- Throw and catch exceptions
- Invoke undercover agent (use this tool to attach an undercover agent (UCA) to the event to call the service that you specify)
- Manage event
- Embed a nested service implementation
- Send an alert (message)

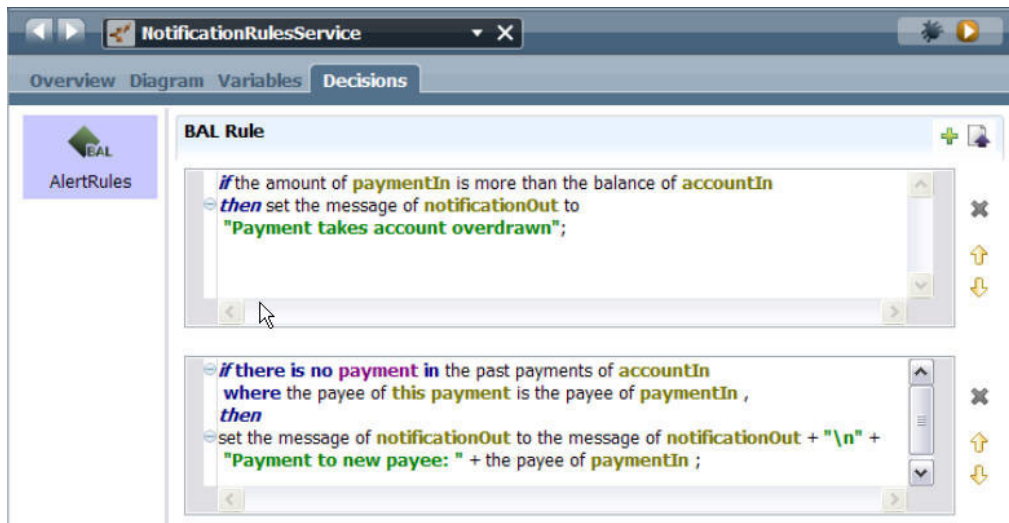
***Instructor notes:*****Purpose —****Details —**

**Additional information —** About UCAs: When you include a Message Event in a BPD, you must attach an undercover agent (UCA) to the event to call the service that you specify. For example, when a message event is received from an external system, a UCA is needed to invoke the appropriate service in response to the message.

**Transition statement —**

## Business action language (BAL)

- Natural language-type of rule building process
- Each BAL rule composed of four parts:
  - Definitions
  - Conditions (the “if” part)
  - Actions (the “then” part)
  - Optional actions (the “else” part)



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Figure 5-10. Business action language (BAL)

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### Notes:

- **Definitions:** The definitions part of a rule gives you more control over your business rules when you set variables at the beginning of your rule. Variables help you identify and then reference an occurrence of a business term by a convenient name. Use variables to make your business rules less ambiguous and easier to understand.
- **Conditions:** The condition part of a rule specifies under what conditions the actions in the action part of the rule is carried out. Conditions are represented in the rule editor by the text (or number) that appears after if, ending at then. The word then signals the beginning of the action part of the rule.
- **Actions and Optional actions:** The action part of a rule describes what to do when the conditions of the rule are met. Actions are represented in the rule editor by the text that appears after then and else. If there is more than one action to perform, the actions are carried out in the order that they appear in the action part of the rule.



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Guidelines for building a decision service

- Order rules from most to least complex
- Create a final condition
  - The “catch-all” rule
  - Use catch-all for guaranteeing a response
- Encapsulate rules in a single decision service
  - Compartmentalizes rules
  - Makes service available to other parts of process app
- Limitations:
  - You cannot create complex rules that use decision tables and BAL rules in a single component
  - You cannot write rules that include methods
  - The rule editor does not support rules that include data with complex relationships
  - The rule editor does not support certain variable types

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Figure 5-11. Guidelines for building a decision service

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### Notes:

The rule editor does not support the following variable types in business objects: SQLResult, XMLDocument, XMLElement, or XMLNodeList

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## **5.2. Human tasks**

### **Instructor topic introduction**

## Human tasks



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Figure 5-12. Human tasks

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### Notes:

***Instructor notes:***

**Purpose** — Introduce the topic

**Details** —

**Additional information** —

**Transition statement** —

## Overview of human task support

- Human interaction is key to many business integration applications
  - Human input or review is often required
  - Automation is not possible for some tasks
  - Error or exception situations may require handling by person
- Human tasks in IBM Business Process Manager are robust and follow a service-oriented approach
  - Generate, assign, and store tasks for individuals and groups listed in organizational directories
  - Specify different levels of authority
  - Transfer and suspend tasks
  - Enable expiration, escalation, notification, subtasks, follow-on tasks, and participant substitution
  - Generate custom web clients for tasks

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Figure 5-13. Overview of human task support

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### Notes:

Frequently, business processes require human interaction. For example, a document may require review by a person. Error situations sometimes require human interaction as well. Human interaction can present some unique challenges.

Tasks must be assigned to the correct people, and a means for people to claim work items must be provided. Notifications are often necessary to alert users about a task or to escalate the task. Users are often not technically savvy, requiring more time spent on the user interface. The time spent on human interaction can become a major portion of the time spent on integration, shifting focus from the business problems that must be solved.

Human task support in IBM Process Server and IBM Integration Designer solves many of these difficult problems. Human tasks can be used outside a business process, helping to avoid the high cost of a BPEL process when one is not necessary. Tight integration of human tasks and BPEL processes is supported, but they can be used for other, simpler tasks as well.



***Instructor notes:***

**Purpose —**

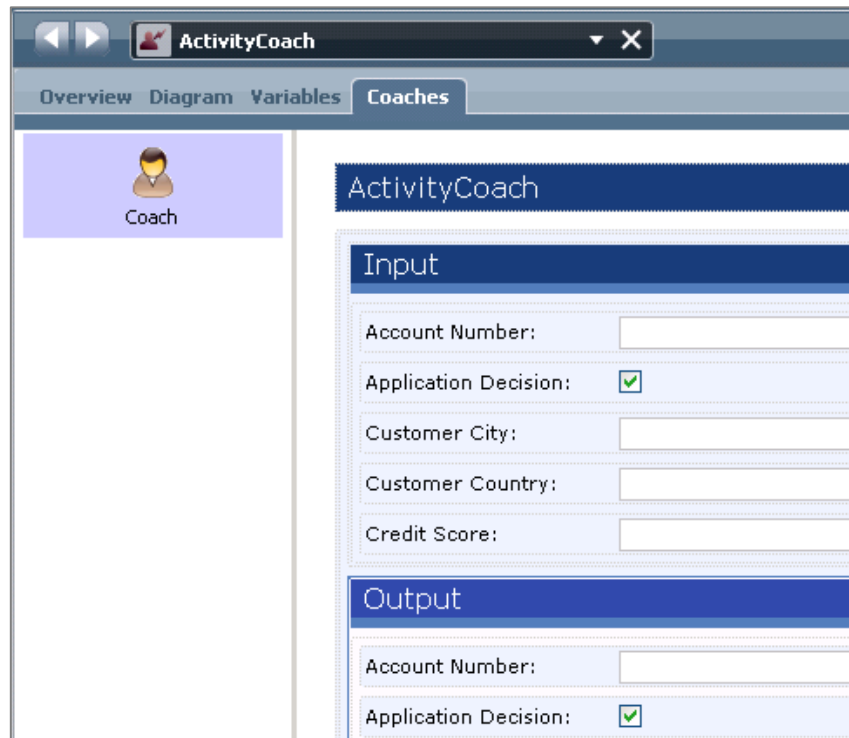
**Details —**

**Additional information —**

**Transition statement —** Next: Coaches (1 of 2)

## Coaches (1 of 2)

- Coaches are the web-based interfaces where process participants do the work that is required to complete each task
- Coaches can include information about the task or process and various controls
- The coach is created in the IBM Process Designer in the Human Services editor



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Figure 5-14. Coaches (1 of 2)

WB754 / VB7541.0

### Notes:

Coaches are the web-based interfaces where process participants do the work that is required to complete each task.

Coaches can include information about the task or process and various controls, such as drop-down lists, edit boxes, check boxes, and radio buttons, that enable you to provide your own input into the process.

When you build human services, you usually include coaches, which provide the interfaces for user interaction.

In the first stage of designing a coach, your goal may be to build a mockup with static elements. In this way you can visualize what data is needed in the runtime coach, and where the data needs to be displayed in the layout. After you have designed the interface of the coach, you need to feed real business data to the coach controls for your process participants to interact with, and to help them make appropriate decisions. This process requires creating bindings between the coach controls and the data structures (variables) that represent the business data within your IBM Business Process Manager processes.

***Instructor notes:***

**Purpose —**

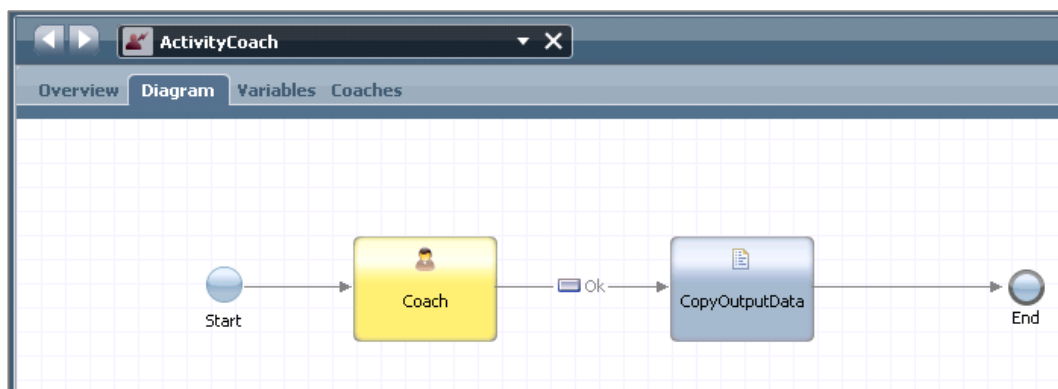
**Details —**

**Additional information —**

**Transition statement —** Next: Coaches (2 of 2)

## Coaches (2 of 2)

- The coaches for tasks in a process instance are generated by the underlying services for the activities in the business process definition (BPD)
- The Human Service editor has a tab that lists all the coaches in that service definition
- An XML document is created that is passed through an XSLT transformation, and the XML converted to an HTML document



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Figure 5-15. Coaches (2 of 2)

WB754 / VB7541.0

### Notes:

When you run a task in IBM Process Portal, the task opens a coach in a new window. For each task, you may be required to complete one coach or a series of coaches. Complete the information required to complete the coach and then submit the information.

When the IBM Process Designer is used to build the layout of the screen, what is created is an XML document that contains a description of how the screen looks. This XML document is then passed through an XSLT transformation, and the XML converted to an HTML document. It is the HTML document that is sent to the browser and visualized to the user.

If you switch to Preview mode, the HTML generated from the XML or XSLT transform can be seen. Errors are shown as the HTML contains code that is interpreted at the runtime server, and hence the content is not 100% pure HTML.

***Instructor notes:*****Purpose —**

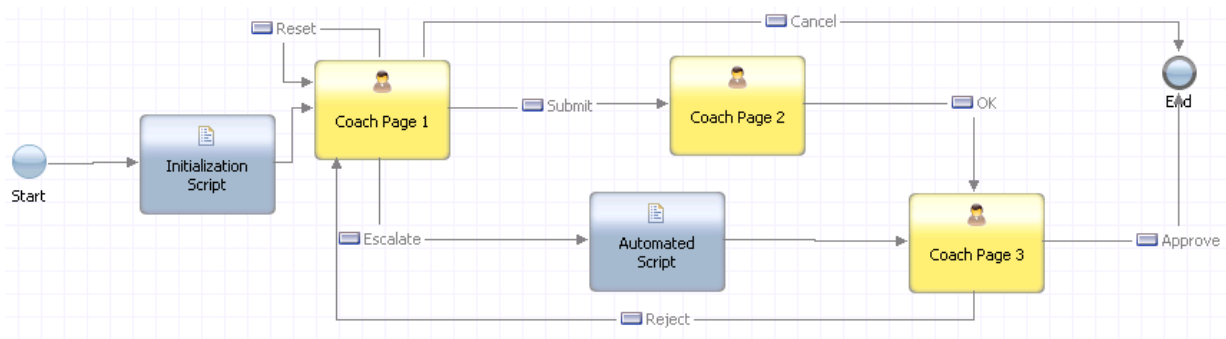
**Details —** Mention to the class that in the last day when they work with the Process Center lab, there is a complete section on coach.

**Additional information —**

**Transition statement —** Next: History log for human tasks

## Human task flow using coaches

- Pages are directly related to coaches
- Control is managed through human service flows
- Input and output can be controlled in to and out from coaches
- Human task flow may be controlled with:
  - Decision gateways
  - Exceptions (throw and catch)
  - Events (alerts)
  - Nested services



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Figure 5-16. Human task flow using coaches

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

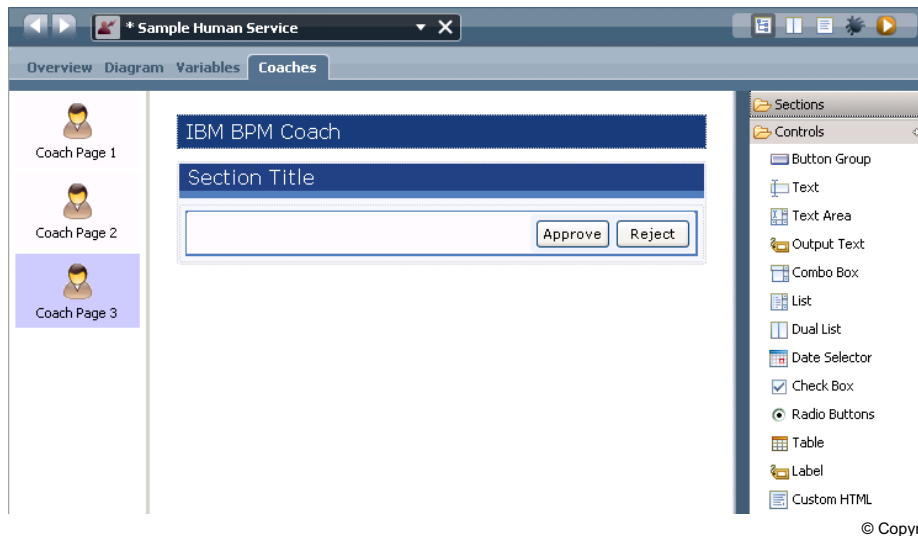
**Details —**

**Additional information —**

**Transition statement —**

## The coach editor

- Easy to use graphical interface for creating human service displays
- Drag functionality for controls, layouts, and so on
- Create functional buttons which directly relate to flow control
- Single editor environment for all coaches in human service flow
- Add variables and customize sections



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Figure 5-17. The coach editor

WB754 / VB7541.0

### Notes:



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Escalation with coach components

- Escalation is managed in the flow
- Escalation is handled with Modify Task tool
- Properties to set in Modify Task:
  - Due Date, Narrative, Priority, Reassign, Status, and Subject
- Use other actions to affect escalation:
  - Postpone, scripts, scriptlets, decision gateways, or more coaches

The screenshot shows the 'Modify Task' dialog box in IBM Business Process Manager. The 'Properties' tab is selected, and the 'Due Date' sub-tab is active. The 'Task Modifications' list on the left includes 'Due Date', 'Narrative', 'Priority', 'Reassign', 'Status', and 'Subject'. The 'Due Date' section on the right contains the following fields:

- Enabled:** ☐
- Due Date Option:**
- Increment Quantity:**
- Increment Type:**
- Time Schedule:**
- Timezone:**
- Holiday Schedule:**
- Ignore Exceptions on Conflict:** ☒

At the bottom, there are fields for 'Use Other Task:' (checkbox) and 'Other Task ID:' (text box).

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Figure 5-18. Escalation with coach components

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Assignment and user registry: Participant Groups

- Participant groups added to process app or toolkit
  - Meta-level from human service
- Participant groups may be composed of:
  - Users or groups from IBM Process Center repository
  - System-defined users or groups
  - Programmatic users or groups
- Participant groups also used in optimization of processes

### Participant Group



<b>Common</b>		<b>Simulation Properties</b>	
Name:	Sample Participant Group	Capacity:	Use Estimated Capacity 2
Modified:	admin (Oct 12, 2011 1:24:34 PM)	% Availability:	
Documentation:		% Efficiency:	
		Cost per Hour:	10.00
<b>Members</b>			
Select:	Standard Members		
			Add user Add group Remove

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Figure 5-19. Assignment and user registry: Participant Groups

WB754 / VB7541.0

### Notes:

Participant Groups are added to each process app or toolkit, at a meta-level from the human service itself. The users or groups themselves are added in the IBM Process Center interface, and are related to the users and groups as defined in the IBM Process Center repository. Programmatic, or system-defined users or groups may also be added to participant groups. These users and groups need to be coded: IBM Process Designer does not offer the same user registry framework capabilities that are present with the Virtual Member Manager of IBM Integration Designer. IBM Process Designer does not offer direct connection to other types of user registries, such as LDAP.

***Instructor notes:***

**Purpose —**

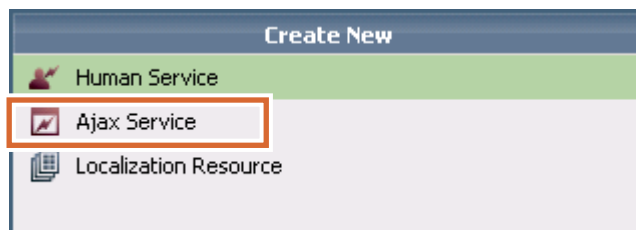
**Details —**

**Additional information —**

**Transition statement —**

## Ajax service

- Coaches use standard HTML for display
- Ajax service offers greater interoperability
- Ajax clients may be added as new services
- Ajax clients require extensive customization
  - Clients arranged in flow, like human service
  - No graphical editor for creating Ajax client



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Figure 5-20. Ajax service

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**





## **5.3. Other implementations**

### **Instructor topic introduction**

## Other implementations



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5411

Figure 5-21. Other implementations

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Service implementations overview

- IBM Process Designer offers other implementation options:

- Integration service
- General system service
- External activity
- Undercover agent
- Web service
- Advanced integration service



- These implementations are heavily coded and automated

- Used mostly for integration

- Web services
- IBM Integration Designer artifacts
- External services
- Java classes
- And so on

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Figure 5-22. Service implementations overview

WB754 / VB7541.0

### Notes:

- **Integration service:** Build an Integration service when you want to integrate with an external system to complete a task. For example, you may want users to choose from a list of products available from a common site on the internet. In that case, you can build an Integration service that calls a web service to display the list of options. Integration services are the only services that can include Web Service Integration and Java Integration components.
- **General system service:** Use General System services when you want to orchestrate other background services, manipulate variable data, generate HTML for a Coach, or perform some other actions that do not require any integrations or business rules. General system services are likely to be called directly from a BPD or from a Human Service. General System services can include only basic service components such as scripts and cannot contain Coaches or integration components (web service integration or Java integration). General System services can be nested within any other type of service.

- **External activity:** You can create external activities to include activities that are handled by systems outside of IBM Business Process Manager. For example, you can model an activity that is executed by an Eclipse RCP or Microsoft .NET application.
- **Undercover agent:** When you include a Message Event in a BPD, you must attach an undercover agent (UCA) to the event to call the service that you specify. For example, when a message event is received from an external system, a UCA is needed to invoke the appropriate service in response to the message. A UCA is started by an event. Events can either be triggered by a message or on a specific schedule. When a UCA is started, it invokes an IBM Business Process Manager service in response to the event.
- **Advanced integration service:** Build an Advanced Integration service when you want to integrate with a service created in Integration Designer. For example, your business process may need a list of computer parts in your warehouses in Canada. Checking with an Integration Designer developer, you realize that a service is being built in Integration Designer to query the Canadian warehouses and return an inventory list of the computer parts available. You could create an Advanced Integration service that would use this Integration Designer service as an activity in your business process.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Mapping implementation services

IBM Process Designer	IBM Integration Designer	Notes
Integration service	Java component, import or export	Used as placeholder for Java class or WSDL file
General system service	Java component	Built using JavaScript, not Java
External activity	Adapter	Requires extensive customization
Undercover agent	Mediation or event handler (BPEL)	Acts as listener for external events, always attached to another service
Web service	Import or export	SCA component with web service binding
Advanced integration service	Any	Used as placeholder for IBM Integration Designer artifacts

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Figure 5-23. Mapping implementation services

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## Using implementation services

- Many services require extensive customization
  - JavaScript used for customization
  - Integration services point to Java classes
  - Scripting language limited, not portable
  - Data mapping is not separated from implementation
- External activity service
  - Holds connection details and parameters
  - Requires connection to be pre-built
  - Does not use or support a framework
- Recommendations:
  - Use integration service as placeholder for Java classes
  - Use advanced integration service as placeholder for IBM Integration Designer artifacts
  - Use undercover agent as listener
  - Design complex integrations using IBM Integration Designer

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Figure 5-24. Using implementation services

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

## Unit summary

Having completed this unit, you should be able to:

- Define the purpose and business value of using business rules
- Describe the support for JRules in IBM Process Designer
- Compare and contrast business rules between IBM Process Designer and IBM Integration Designer
- Describe the business value of human tasks
- Relate human task components to activities in a business process diagram
- Describe support for human task user interface generation in both IBM Process Designer and IBM Integration Designer
- Compare and contrast the implementation of human task components between IBM Process Designer and IBM Integration Designer

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Figure 5-25. Unit summary

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### **Notes:**

***Instructor notes:***

**Purpose** — Summarize the learning points in the unit

**Details** — Repeat the unit objectives or perform another review to summarize the learning points

**Additional information** —

**Transition statement** —

## Checkpoint

1. True or false: a decision service contains a BAL rule, JRule rule service, or decision table, but never more than one in the same service.
2. True or false: a coach component models a user input page to be used in a human service flow.
3. True or false: use an integration service to invoke Java code.
4. Which one of the following services contains artifacts from IBM Integration Designer:
  - a) External activity
  - b) Integration service
  - c) Advanced integration service
  - d) Web service

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Figure 5-26. Checkpoint

WB754 / VB7541.0

### Notes:

Write your answers here:

1.

2.

3.

4.

***Instructor notes:***

**Purpose** — Checkpoint questions to verify understanding

**Details** — These questions must be multiple choice, true/false, or sequencing only so they can be repurposed in SPVC e-learning.

**Additional information** —

**Transition statement** —

## Checkpoint answers

1. **False.** A decision service may contain any number of BAL rules, JRule rules, or decision tables in a single decision service.
2. **True.** A single human service may contain several coaches. The orchestration of the coach components is managed in the human service flow.
3. **True.** An integration service acts as a placeholder for a Java class or interface APIs.
4. **(c).** An advanced integration service acts as a placeholder for implementation artifacts from IBM Integration Designer

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Figure 5-27. Checkpoint answers

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**



## Exercise

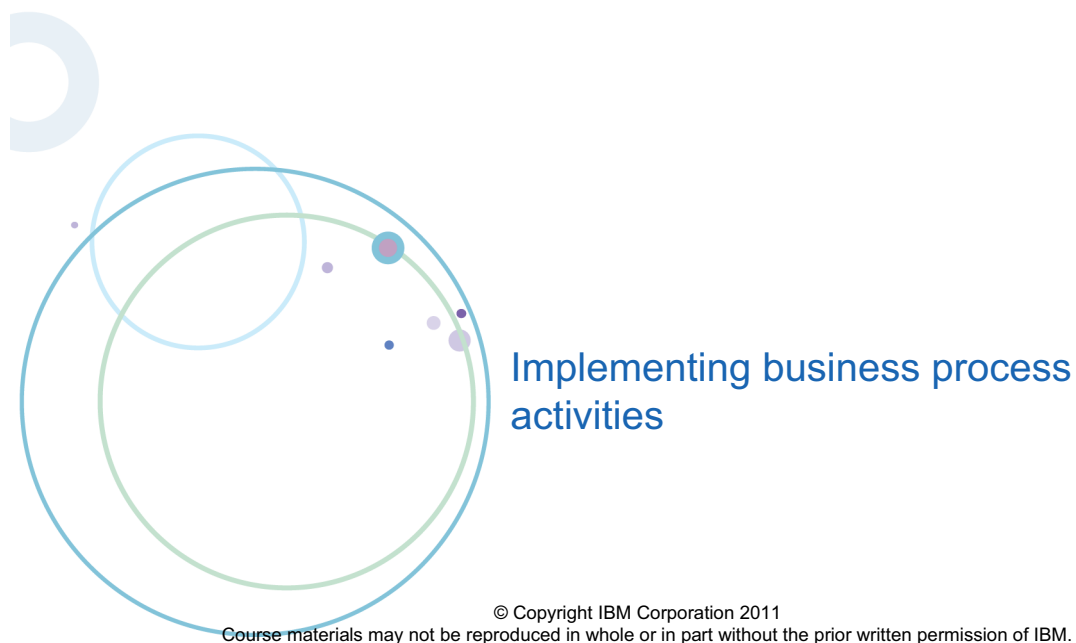


Figure 5-28. Exercise

WB754 / VB7541.0

### Notes:

***Instructor notes:***

**Purpose** — Introduce the exercise.

**Details** — This slide provides an introduction to an exercise (such as a hands-on lab exercise, or team exercise).

**Additional information** —

**Transition statement** —

## Exercise objectives

After completing this exercise, you should be able to:

- Create simple activity implementations in IBM Process Designer
- Create a simple business rule implementation in IBM Process Designer
- Create a coach component in IBM Process Designer
- Integrate a process in IBM Integration Designer with a process application using a coach component

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Figure 5-29. Exercise objectives

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### **Notes:**

***Instructor notes:***

**Purpose** — List the exercise objectives.

**Details** —

**Additional information** —

**Transition statement** —

## Unit 6. Course summary

### Estimated time

00:30

### What this unit is about

This unit summarizes the course and provides resources that you can use to learn more about IBM Integration Designer and WebSphere Enterprise Service Bus.

### What you should be able to do

After completing this unit, you should be able to:

- Explain how the course met its learning objectives
- Submit an evaluation of the class
- Identify other WebSphere Education courses related to this topic
- Access the WebSphere Education website
- Locate appropriate resources for further study

## Unit objectives

After completing this unit, you should be able to:

- Explain how the course met its learning objectives
- Submit an evaluation of the class
- Identify other WebSphere Education courses related to this topic
- Access the WebSphere Education website
- Locate appropriate resources for further study

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---

Figure 6-1. Unit objectives

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Course learning objectives

## Course learning objectives

Having completed this course, you should be able to:

- Describe the IBM Business Process Manager V7.5 architecture
- Describe the purpose and business value of the tools included in IBM Business Process Manager Advanced V7.5, including IBM Process Designer, IBM Integration Designer, IBM Process Server, and WebSphere Enterprise Service Bus
- Identify and describe the features available in IBM Process Designer, IBM Integration Designer, and the Service Component Architecture
- Describe the structure of process applications and toolkits in IBM Process Designer
- Model a business process diagram in IBM Process Designer
- Work with business objects, business process diagrams, and activity implementations in IBM Process Designer
- Demonstrate the execution of a business process diagram using IBM Process Designer tools such as Playback
- Examine human task implementations using coach components

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Figure 6-2. Course learning objectives

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### Notes:



***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Class evaluation

## Class evaluation

- Your comments about this class are useful to WebSphere Education.
- Feedback on the site, curriculum, and instructor tell WebSphere Education what was good about the class and what can be improved.
- Take the time to fill out the course evaluation on the IBM Training website at <http://www.ibm.com/training/osart>.

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Figure 6-3. Class evaluation

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: To learn more on this subject

## To learn more on this subject

- WebSphere Education website:  
[www.ibm.com/websphere/education](http://www.ibm.com/websphere/education)
- Training paths:  
[www.ibm.com/software/websphere/education/paths](http://www.ibm.com/software/websphere/education/paths)
  - Identify the next courses in this sequence
- Resource Guide
  - Contains information about many useful sources of information
    - Many of these sources are free
  - See handout in your class materials, or download a copy
    - [www.ibm.com/developerworks/wikis/display/WEinstructors/WebSphere+Resource+Guide](http://www.ibm.com/developerworks/wikis/display/WEinstructors/WebSphere+Resource+Guide)
- Email address for more information:  
[websphere\\_skills@us.ibm.com](mailto:websphere_skills@us.ibm.com)
- Education CD and documents in your class materials

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Figure 6-4. To learn more on this subject

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### Notes:

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: References

## References

- IBM Business Process Manager V7.5 Information Center
  - <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/index.jsp>
- BlueWorks Live
  - <https://www.blueworkslive.com>
- IBM developerWorks for Business Process Management
  - <http://www.ibm.com/developerworks/websphere/zones/bpm>

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Figure 6-5. References

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### Notes:

#### OSOA — Service Component Architecture family of specifications

<http://www.osoa.org>

#### Service Data Objects (SDO) articles on IBM developerWorks

<http://www.ibm.com/developerworks/library/j-commonj-sdowmt/>

<http://www.ibm.com/developerworks/java/library/j-sdo/>

#### SDO JavaDoc from Eclipse.org

<http://www.eclipse.org/modeling/emf/?project=sdo>

#### Eclipse Model Framework (EMF)

<http://www.eclipse.org/emf/>

#### XML schema

<http://www.w3.org/XML/Schema>

## **IBM Redbooks**

<http://www.redbooks.ibm.com>

IBM Redbooks publications are developed through a unique residency program that teams IBM technical professionals with business partners, customers, and IBM product development staff. Depending on the market needs of a product or solution, a team of residents is chosen through a competitive nomination process. This team works at one of the IBM International Technical Support Organization (ITSO) centers for two to eight weeks, devoted to developing an IBM Redbooks publication.

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —** Next: Unit summary



## Unit summary

Having completed this unit, you should be able to:

- Explain how the course met its learning objectives
- Submit an evaluation of the class
- Identify other WebSphere Education courses related to this topic
- Access the WebSphere Education website
- Locate appropriate resources for further study

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Figure 6-6. Unit summary

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### **Notes:**

***Instructor notes:***

**Purpose —**

**Details —**

**Additional information —**

**Transition statement —**

# Appendix A. List of abbreviations

## A

**ACL** access control list  
**ACORD** Association for Cooperative Operations Research and Development  
**AFC** Adapter Foundation Classes  
**AIX** Advanced IBM UNIX  
**Ajax** Asynchronous JavaScript and XML  
**Ant** Another Neat Tool  
**API** application programming interface  
**AVS** Account Verification Skeleton

## B

**B2B** business-to-business  
**BAL** Business Action Language  
**BAM** business activity monitoring  
**BFM** Business Flow Management  
**BFM** Business Flow Manager  
**BG** business graph  
**BI** business integration  
**BO** business object  
**BPC** Business Process Choreographer  
**BPD** business process definition  
**BPD** Business Process Diagram  
**BPEL** Business Process Execution Language  
**BPEL4WS** Business Process Execution Language for Web Services  
**BPELJ** Business Process Execution Language for Java  
**BPM** business process management  
**BPMN** Business Process Modeling Notation  
**BRM** business rules manager  
**BSS** business support systems

## C

**C++** C object-oriented programming language  
**CD** compact disc  
**CEI** Common Event Infrastructure  
**CICS** Customer Information Control System  
**COBOL** Common Business Oriented Language  
**CRM** customer relationship management  
**CRON** Chronograph  
**CSV** comma-separated values  
**CVS** Concurrent Versions System

## D

**DAS** data access service

**DB** database  
**DB2** Database 2  
**DESPI** Data Exchange Service Provider Interface  
**DOS** Disk Operating System

## **E**

**EAI** Enterprise Application Integration  
**EAR** enterprise archive  
**ECI** External Call Interface  
**ECS** event correlation sphere  
**EE** Enterprise Edition  
**EIS** enterprise information system  
**EJB** Enterprise JavaBeans  
**EMD** Enterprise Metadata Discovery  
**EMF** Eclipse Modeling Framework  
**ERC** edition revision code  
**ERP** enterprise resource planning  
**ESB** enterprise service bus

## **F**

**FAQ** frequently asked questions  
**FFDC** First Failure Data Capture  
**FIFO** first-in first-out  
**FTP** File Transfer Protocol

## **G**

**GB** gigabyte  
**GMT** Greenwich Mean Time  
**GUI** graphical user interface

## **H**

**HATS** Host Access Transformation Service  
**HL7** Health Level 7  
**HR** human resources  
**HTM** Human Task Manager  
**HTML** Hypertext Markup Language  
**HTTP** Hypertext Transfer Protocol  
**HTTPS** Hypertext Transfer Protocol Secure

## **I**

**IETF** Internet Engineering Task Force  
**IID** instance ID  
**IIOP** Internet Inter-ORB Protocol  
**IMS** Information Management System  
**IMS TM** Information Management System Transaction Manager  
**I/O** input/output

**IP** Internet Protocol  
**IT** information technology

## J

**J2C** J2EE Connector architecture  
**J2CA** J2EE Connector Architecture  
**J2EE** Java 2 Platform, Enterprise Edition  
**Jacl** Java Command Language  
**JAR** Java archive  
**JAXB** Java Architecture for XML Binding  
**JAX-RPC** Java API for XML-based RPC  
**JAX-WS** Java API for XML Web Services  
**JCA** Java EE Connector Architecture  
**JDBC** Java Database Connectivity  
**JDT** Java development tools  
**JMS** Java Message Service  
**JNDI** Java Naming and Directory Interface  
**JSF** JavaServer Faces  
**JSON** JavaScript Object Notation  
**JSP** JavaServer Pages  
**JSR** Java Specification Request  
**JVM** Java virtual machine

## K

**KPI** key performance indicator

## L

**LDAP** Lightweight Directory Access Protocol  
**LIFO** last-in first-out

## M

**MBean** Managed Bean  
**MDB** message-driven bean  
**MIME** Multipurpose Internet Mail Extensions  
**MQ** Message Queue  
**MQMD** MQ Message Descriptor  
**MTOM** Message Transmission Optimization Mechanism

## N

**ND** Network Deployment

## O

**OAGIS** Open Applications Group Integration Specification  
**OASIS** Organization for the Advancement of Structured Information Standards  
**OLTP** online transaction processing  
**ORB** Object Request Broker

**OS** operating system  
**OSOA** open service-oriented architecture  
**OSS** operations support systems

## **P**

**PC** personal computer  
**PDF** Portable Document Format  
**POJO** plain old Java object

## **Q**

**QoS** quality of service

## **R**

**RAR** resource adapter archive  
**RAS** reusable asset specification  
**REST** Representational State Transfer  
**RMI** Remote Method Invocation  
**RMI/IIOP** Remote Method Invocation over Internet InterORB Protocol  
**RPC** Remote Procedure Call  
**RPG** Report Program Generator  
**RUP** Rational Unified Process

## **S**

**SACL** State Adaptive Choreography Language  
**SAP** Systems Applications and Products (data processing)  
**SCA** Service Component Architecture  
**SCDL** Service Component Definition Language  
**SDK** software development kit  
**SDO** Service Data Object  
**SIB** service integration bus  
**SIBus** service integration bus  
**SLA** service level agreement  
**SMB** small and medium-sized business  
**SMO** service message object  
**SMTP** Simple Mail Transfer Protocol  
**SNA** Systems Network Architecture  
**SNMP** Simple Network Management Protocol  
**SOA** service-oriented architecture  
**SOAP** a lightweight, XML-based protocol for exchanging information in a decentralized, distributed environment. Usage note: SOAP is not an acronym; it is a word (formerly an acronym for Simple Object Access Protocol)  
**SOI** service-oriented integration  
**SPI** service provider interface  
**SQL** Structured Query Language  
**SSL** Secure Sockets Layer  
**SSO** single sign-on

## T

**TCP** Transmission Control Protocol  
**TCP/IP** Transmission Control Protocol/Internet Protocol  
**TIBCO** The Information Bus Company  
**TLS** Transport Layer Security  
**TM** Transaction Manager

## U

**UDB** Universal Database  
**UDDI** Universal Description, Discovery, and Integration  
**UDP** User Datagram Protocol  
**UI** user interface  
**UML** Unified Modeling Language  
**UNIX** Uniplexed Information and Computing System  
**URL** Uniform Resource Locator  
**UTC** Coordinated Universal Time  
**UTC** Universal Test Client  
**UTE** unit test environment  
**UTF** Unicode Transformation Format  
**UTF-8** Unicode Transformation Format (8-bit)

## V

**VM** virtual machine  
**VMM** virtual member manager

## W

**W3C** World Wide Web Consortium  
**WAN** wide area network  
**WAR** web archive  
**WLM** workload management  
**WS** web services  
**WS-BPEL** Web Services Business Process Execution Language  
**WSDL** Web Services Description Language  
**WSIL** Web Service Inspection Language  
**WS-N** Web Services Notification  
**WSRR** WebSphere Service Registry and Repository  
**WS-Security** Web Services Security  
**WTE** WebSphere Test Environment  
**WWW** World Wide Web

## X

**XA** Extended Architecture  
**XCT** cross-component tracing  
**XMI** XML metadata interchange  
**XML** Extensible Markup Language  
**XML4J** XML Parser for Java

**XOP** XML-binary Optimized Packaging

**XPath** XML Path Language

**XSD** XML Schema Definition

**XSL** Extensible Stylesheet Language

**XSLT** Extensible Stylesheet Language Transformation





